

# Hradec Economic Days

Vol. 9(2)

Double-blind peer-reviewed proceedings part II.  
of the International Scientific Conference  
Hradec Economic Days 2019

February 5–6, 2019  
Hradec Králové, Czech Republic

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University of Hradec Králové  
Faculty of Informatics and Management

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## Preface

Ladies and gentlemen, dear colleagues,

the Hradec Economic Days conference has been traditionally and continuously held since 2003. University of Hradec Králové organized the *17<sup>th</sup> Hradec Economic Days* conference in cooperation with the Wrocław University of Economics, the Cracow University of Economics and the Office of Transfer of Technologies at the University of South Bohemia. The conference was held from February 5 to February 6, 2019. It aimed to promote the idea of communication and cooperation of scientists from various fields with practitioners. The conference was in 2019 subtitled "Innovation and socio-economic development". This year conference scopes were to address following fundamental issues of:

- economic growth and employment, environmental and social challenges,
- changing roles of innovation, production, logistics, and service processes,
- innovative approaches to the management of operational processes,
- intellectual property rights,
- technology transfer and resource implications,
- financial innovations and focus on the consumer,
- new trends in the economy and its impacts on globalization.

Hradec Economic days conference has undergone dynamic development since the first year in both quality and quantity. The program committee also undergone fundamental change as well in favor of a substantial increase in the spectrum of international academicians from the USA, China, Malaysia, Spain, Croatia, Slovakia, Romania, Poland, and the Czech Republic. In 2019 we again cooperated with the MDPI publishing and two of their journals indexed in the Emerging Sources Citation Index (ESCI). The highest quality papers are to be revised for a possible inclusion in the special issue of *Economies* open access journal and the *Systems* open access journal published by MDPI. The best conference paper was awarded by 600 CHF price provided by the MDPI publishing.

All submitted papers undergone careful selection and were reviewed by 2-3 reviewers. We selected the best 113 papers in English that were published in two proceedings volumes. Authors of the conference papers are scientists and practitioners from the Czech Republic, Slovakia, Ukraine, Poland, Norway, China, Hungary, Mexico, Romania, and Denmark.

I am very pleased we succeeded in indexation of the 2018 proceedings, and I firmly believe that the changes the conference has undergone will contribute to regular indexation also in the future. We are also grateful for a tradition of cooperation with the Czech National Bank representative. Moreover, this year's conference was held under the auspices of the Czech National Bank which also provided a panel discussion on the topic of "100 years of Czech koruna" anniversary.

I want to thank all who participated in organizing the conference: thank you for your high-quality work. My thanks also go to the authors for their trust and support, and I am looking forward to seeing you again at HED2019.

Hradec Kralove, January 5, 2019

Assoc. Prof. Petra Marešová  
General Chairman of Hradec Economic Days  
Faculty of Informatics and Management  
University of Hradec Kralove





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## Reproduction of the Qualified Personnel of Working Professions in Agriculture

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**Abstract.** Despite the presence of stable demand for food and other agricultural resources, the trend of reducing the number of workers in agriculture in almost all countries of the world in the coming years will continue. This reduction should be partially compensated by the growth of labor productivity and the strengthening of the technical equipment of the industry, innovations and improvements in the applied methods, tools and production technologies. On the other hand, the reduction in the number of personnel in working professions must be compensated for by increasing their professionalism and compliance with professional standards. In these conditions, the requirements for professional competence of workers in working professions in the implementation of production processes for the cultivation, harvesting and post-harvest processing of crop products, maintenance and care of farm animals and poultry, land reclamation and other work should be carried out in strict accordance with the organizational and economic principles of agricultural production. In order to identify factors affecting the turnover of workers in agricultural occupations, we conducted a special correlation and regression analysis, which allowed us to establish that the main ones are: labor remuneration; the number of hospital beds per 10,000 people in rural areas; the proportion of women in the staff of the working professions of agricultural organizations; the level of profitability of agricultural enterprises; the proportion of personnel working professions of agricultural organizations under the age of 30 years; the size of the energy capacity per 100 hectares of sown area of agricultural organizations.

**Keywords:** Labor Resources, Agriculture, Reproduction, Personnel of Working Professions.



## 1 Introduction

The mechanism of reproduction of skilled workers in existing professions for various reasons turned out to be disorganized and no longer justifies itself, and the creation of a new mechanism for reproducing skilled workers in occupations is very relevant and requires study and a science-based approach, taking into account the influence of many-sided external factors environment of the region.

The aim of our study is to study the trends in the reproduction of skilled workers in agricultural occupations.

The materials and methods used in the work include methods of analysis and synthesis, induction, deduction, abstract, logical and tabular method.

The information base of the study was compiled by official data of the Federal State Statistics Service for the Republic of Bashkortostan for the period from 1990 to 2016.

## 2 Literature Review

Modern agricultural production in the countries of the European Union places high demands on the labor force. In the work of Marcel Gerds, Axel Poehis, devoted to the analysis of determining the importance of the various competences and skills of agricultural workers from the point of view of farm managers of Mecklenburg-Western Pomerania (Mecklenburg-Vorpommern), knowledge is defined as the most important characteristic of the labor force. In addition, Marcel Gerds and Axel Poehis [13] note that employee's interest in achieving concrete results, reliability, autonomy, flexibility, motivation, qualifications, abilities, willingness to learn, teamwork and employee honesty are also important characteristics of employees from the point of view of agricultural employers.

In his research, Marcel Gerds [12] also notes that "qualifications, knowledge, and skills are the competitive advantages of employees". Как отмечает в своих исследованиях Thomas Hentschel [4], «Currently, there is a growing demand for more skilled workers in agriculture».

The work of Thomas Hentschel and Theodor Fock [15] are devoted to the changing nature of work in agriculture associated with the growing industrialization of agriculture. In contrast to the often monotonous and repetitive work in industrial production processes, agriculture deals with live animals and plants, which depend on biological and other factors, often subject to considerable fluctuations in the natural process. In this regard, the agricultural worker must have extensive knowledge and experience, both in crop production and in animal husbandry.

In connection with the growth of mechanization, specialization, more complex legal and political conditions and sustainable growth of farms, according to Nicola Guidel, Pamela Laven, Reiner Doluschits [3], the requirements for the professional qualifications of workers are only increasing. Due to the "lack of specialists, it is becoming more and more difficult to find skilled workers».

Among the countries with a high share of employment of skilled workers in agriculture, forestry and fisheries in 2016 stand out: Romania (21.4%), Greece (12%),

Poland (10.4%), Portugal (7.1%) , Croatia (7%), Lithuania (6.1%), Ireland (5%), Austria (4.5%), Slovenia (4.2%), Latvia (3.9%), Finland (3.8 %), Bulgaria (3.7%), France (3.2%) [2]. According to Eurostat, in the period from 2015 to 2025. A further decline in employment of skilled workers in the agriculture, forestry and fisheries sectors is expected to continue by another 15%.

In connection with the increasing requirements for the professionalism and competence of workers, among the main professional requirements for specialists in the field of agriculture, forestry and fisheries, employees employers highlight the responsibility for growing, maintaining and harvesting crops; raising livestock, caring for forests; collecting fish. Among the five key skills required for these workers are teamwork, problem solving, training, ability to plan their work and professionalism. In Latvia, the Kingdom of the Netherlands and Romania there is a shortage of skilled personnel in agriculture, forestry and fisheries, while in Spain, France and Poland, on the contrary, there is an excess of workers.

Despite the presence of stable demand for food and other agricultural resources, the trend of reducing the number of workers in agriculture in the next ten years will continue, accompanied by an increase in labor productivity and the strengthening of the technical equipment of the industry, innovations and improvements in applied production methods. Under these conditions, the requirements for professional competence of specialists in the field of agriculture are strengthened not only in the direction of technological and analytical knowledge and skills, including the operation and maintenance of equipment, knowledge of plant and animal life, but also in smoothing the negative impact of industry development on the environment and environmental processes. As part of the staff of working professions qualified personnel occupy 90% of jobs.

According to Eurostat forecasts for the period up to 2025, the number of highly skilled jobs in the agricultural sector will increase by 300 thousand jobs, while employment in low-skilled jobs will decrease by 1.1 million jobs. For most European countries, as well as for Russia, a tendency of aging personnel is typical. This is clearly manifested in the fact that the proportion of agricultural workers in Europe aged 50 years and older is about 45%. In this regard, in the next ten years, about four million workers in the agricultural sector may retire. Then the total demand for specialists will be 4.5-5 million people. In this regard, the requirements for succession planning, mentoring and career development come to the fore. Senior agricultural workers should have the opportunity to acquire knowledge in the field of technical information, since the prevalence of robotics and advanced technology in agriculture will allow you to get away from the old methods of farming, manual labor and basic maintenance of machines, to support robots ("agribots").

Analytical software and cloud computing in the agricultural sector will allow large and medium-sized farmers to become owners of electronic tools that can be used in the precision farming system. At the same time, the software will become digital evidence and the basis for national agricultural regulators and the European Union to fulfill the conditions of subsidies. Data management will be one of the most important skills in farming practice, allowing workers to process information obtained from various sensors and display systems. Foreign experience in agricultural production has a high

scientific and practical interest, since there are many examples when small countries do not only fully provide their people with quality food, but also export them to other countries.

The works of numerous other foreign and Russian scientists are devoted to the study of the problems of reproduction of skilled agricultural personnel. Our work has been published on this topic (Akhmetyanova A.I. [5], Kolevid G.R., Saitova R.Z. [6], Kuznetsova A.R. [7]).

### **3 Trends in the Reproduction of Skilled Labor in Agriculture**

The reproduction of skilled workers is a multi-faceted task. On the one hand, this is a systematic replenishment of the number of labor resources employed in the agricultural sector and capable of performing the labor functions of service and technical personnel, and on the other, the growth of professionalism and competence of existing staff members.

We have developed the content of the notion of the category “skilled workers in agricultural professions” is clarified: these are competent professionally trained workers who work with a certain complexity, labor-intensiveness and physical activity, with a high degree of subordination to the organizers of labor and employers to perform production tasks and improve the effectiveness of agricultural production performed in adverse weather and climatic conditions (heat, drought, precipitation, wind, humidity, sunshine hydrochloric radiation, atmospheric pressure, etc.) and production conditions in differentiated microclimate (illuminance, air movement, humidity, odor, temperature, etc.).

As a result of studying the category “cadres of working professions in agriculture”, it was established that the category “worker” can be classified according to the following criteria: 1) according to the degree of mechanization of labor; 2) according to the degree of qualification of labor; 3) the intensity of labor; 4) on working conditions; 5) the intensity of the labor process; 6) the level of intellectual activity of workers.

The formation of the labor resources of the country and its regions is based on the natural demographic processes of population reproduction. The demographic situation directly affects the amount of formed labor resources and the security of agricultural organizations with human resources. For the period from 1990 to 2016. the population of the Republic of Bashkortostan increased by 3.3%, the number of labor resources - by 4.5%, the number of people employed in the economy decreased by 10%. The number of students in working age increased by 5.1%. At the same time, there is a significant increase in the number of people of working age who are not employed in the economy – 4.1 times.

As of January 1, 2018, the resident population of the Republic of Bashkortostan was only 4,063.3 thousand people. Out of the total population, the population under working age is 828.3 thousand people (20.4%), at working age - 2261 thousand people (55.6%), older than working age - 974 thousand people (24%). Settlement differences in the age

proportions of the population persist: a higher proportion of the working-age population is observed in urban populations, and an increased prop of the population older than the working-age population is in the rural (Table 1).

**Table 1.** Composition of the population of the Republic of Bashkortostan by integrated age groups (at the beginning of the year) [8, 9, 10].

Years	younger than able-bodied		at working age		older than the able-bodied	
	total, thousand people	in% to total population size	total, thousand people	in% to total population size	total, thousand people	in% to total population size
1990	1059.1	26.9	2183.2	55.4	699.1	17.7
city	646.5	25.7	1474	58.7	392.0	15.6
village	412.6	28.9	709.2	49.6	307.1	21.5
2000	966.3	23.5	2348.2	57.0	805.3	19.5
2005	790.6	19.4	2517.6	61.7	773.1	18.9
2010	736.8	18.1	2525.2	62.1	806.5	19.8
2017	822.6	20.2	2294.1	56.4	950.3	23.4
2018	828.3	20.4	2261.0	55.6	974.0	24.0
city	506.2	20.1	1442.6	57.2	573.2	22.7
village	322.1	20.9	818.4	53.1	400.8	26.0
2018 y. in % to 1990 y. city 2018 y. in % to 1990 z. village 2018 y. in % to 1990 y.	78.2	-6.5	103.6	0.2	139.3	6.3
	77.7	-5.6	97.2	-1.5	145.2	7.1
	79.0	-8.0	117.1	3.6	131.7	4.4

For the period from 1990 to 2018. the total population of the region in working age decreased by 22%, in working age it increased by 3.6%, in older than working age it increased by 39.3%. Population in under working age in urban areas from 1990 to 2018 decreased by 22.3%, in rural - by 21%.

Consider the migration increase (decrease) of the population aged 14 years and older in the agricultural sector and by status in employment for the period from 2010 to 2016. in the Table 2.

From the data presented in Table 2, it follows that in the structure of the loss of workers from the agricultural sector over the past seven years, workers occupying the positions of workers predominate. Their share was 63.6%; specialists - 20.5%, other employees - 19.2%, self-employed - 1.9%. And only in terms of leadership positions there was an increase in the number of only 35 people. Consider the migration increase

(decrease) of the rural population due to circumstances that necessitated a change of place of residence, by age group for 2016 in Table 3.

**Table 2.** Migratory increase (decrease) in the population aged 14 years and older to the branch of agriculture by employment status, (person) [13, 14].

Indicators	2010 y.	2011 y.	2012 y.	2013 y.	2014 y.	2015 y.	2016 y.	Total
Before resettlement, they carried out labor activities - total	129	-3466	-2962	3509	-163	-2184	-4112	-9249
from among those employed were engaged in agriculture, hunting and forestry including:	-210	-230	-203	327	-79	-249	35	-609
for hire - total	-163	-211	-153	347	-59	-242	-3	-484
of them as:								
head	13	4	-3	12	-9	14	4	35
specialist	14	-23	-20	-30	21	-38	-23	-99
other employee	-29	-25	-17	6	-7	-4	-17	-93
worker	-142	-167	-113	359	-64	-214	33	-308
self-employed	-19	9	-10	23	-25	-12	25	-9

**Table 3.** Migration increase (decrease) of the rural population the circumstances that necessitated a change of residence, age groups for 2016, person [13].

Indicators	Total migrants aged 14 and over	including relocation due to			
		with study	with work	return to the former place of residence	reasons of a personal, family nature
Total	-1087	-11201	-2971	2095	605
in able-bodied	-1289	-10181	-2949	1476	-407
older able-bodied	1078	-	-22	614	1000

From the data of table 3 it follows that in the structure of migration growth over working age in rural areas, according to the circumstances that necessitated a change of residence, the largest share was taken by returning to the previous place of residence - 57%; personal, family reasons - 23% and other reasons. In connection with studies in 2016, 10181 people left the region, in connection with work - 2949 people.

Information on the migration of labor resources from the agricultural sector by level of education for the period from 2010 to 2016 presented in Table 4.

**Table 4.** Migration of labor resources from the agricultural sector by education level (at the age of 14 and more), person [13].

Migration increase (decrease)	2010 y.	2011 y.	2012 y.	2013 y.	2014 y.	2015 y.	2016 y.	Total
Before the resettlement were employed in the agriculture, hunting and forestry including had education:	-210	-230	-203	327	-79	-249	35	-609
higher professional	-21	-23	-21	-6	7	-7	-20	-91
doctors of science	-	-	-	-	1	-2	1	0
candidates of science	-1	-2	1	-	-3	1	-1	-5
incomplete higher professional	-3	-15	3		6	-5	-7	-21
secondary vocational	-69	-116	-79	39	-55	-60	26	-314
initial professional	-15	-3	-5	4	-18	-7	12	-32
average total (full)	-72	-46	-72	32	-20	-14	-29	-221
basic general	-14	-21	-14	207	-140	-28	4	-6
initial total	-5	-2	-5	54	139	-129	52	104
education level not specified	-10	-4	-10	-	2	1	-3	-24

From the data presented in Table 4, it follows that the qualitative composition of migrants by level of education from the agricultural sector for the period from 2009 to 2016. It was represented by the following structure: 51.6% migrated with secondary vocational education; with average general (full) - 36.3%, with higher professional - 14.9%, with primary professional - 5.3%, with no indication of the level of education - 3.9%, with incomplete higher - 3.4%, with the main general - 1%, candidates of science - 0.8%. According to official statistics, about 17% of the labor force with primary general education has arrived in the agricultural sector.

Consider the number of people employed in the economy of the Republic of Bashkortostan by industry in Table 5.

**Table 5.** The average annual number of people employed in the economy of the Republic of Bashkortostan by industry for the period from 1990 to 2016 (thousand people.) [1].

Indicators	1990 y.	1995 y.	2000 y.	2010 y.	2014 y.	2015 y.	2016 y.	2016 y. in % to 1990 y.
Total employed in the economy	1926.7	1747.7	1746.2	1752.4	1761.9	1759.9	1742.5	90.4
Industry	592.7	480.1	456.1	365.7	357.3	368.0	356.3	60.1
Agriculture, Forestry	326.4	331.5	366.1	278.6	265.6	222.2	206.2	63.2
Building	239.0	191.7	109.1	144.4	156.3	157.5	164.1	68.7

Indicators	1990 y.	1995 y.	2000 y.	2010 y.	2014 y.	2015 y.	2016 y.	2016 y. in % to 1990 y.
Transport and communication	122.9	97.6	98.4	100.4	108.7	117.4	115.7	94.1
Wholesale and retail trade	139.9	141.3	164.8	271.6	287.7	290.5	297.4	2.1 times
Housing and communal household	67.0	65.6	52.9	51.1	54.0	55.5	58.0	86.6
Health, physical culture and sports	105.0	111.7	111.3	119.7	115.9	114.6	114.3	108.9
Education, culture	218.7	219.9	186.9	180.6	165	160.3	155.8	71.2
	10.2	18.3	13.6	20.2	24.9	26.1	23.5	2.3 times
	104.9	90.0	187.0	220.1	226.5	247.4	251.2	2.4 times

From the data of table 5 it follows that, according to official statistics, the number of people employed in the regional economy decreased by 9.6%, including the number of people employed in industry decreased by 39.9%, in agriculture - by 36.8% in construction - by 31.3%, in education - by 28.8%, in housing and communal services - by 13.4%, in the field of transport and communications - by 5.9%.

In order to identify factors affecting staff turnover in agricultural organizations in 54 municipal districts of the Republic of Bashkortostan on average for 2014-2016, we used the indicators presented in Table 6.

**Table 6.** Factors affecting the turnover of workers in agricultural occupations.

Factors affecting the turnover of blue-collar occupations in agriculture		Power of influence
I	X1 - the proportion of workers who do not have special professional education, in percent;	R = 68,2 D = 46,5 (average connection tightness)
	X2 - the proportion of women in the composition of the work force of agricultural organizations, in percent;	
	X3 - the proportion of labor costs, as a percent;	
	X4 - the level of profitability, in percent;	
	X5 - the proportion of working people older than working age in the composition of the workforce in agricultural organizations, in percent;	
	X6 - the number of hospital beds per 10,000 population;	
	X7 - the proportion of personnel in the working professions of agricultural organizations under the age of 30 years, as a percentage;	
	X8 - the proportion of personnel working professions of agricultural organizations with a category (klassnost)	

Factors affecting the turnover of blue-collar occupations in agriculture		Power of influence
X9 - the size of energy capacity per 100 hectares of sown area of agricultural organizations, horsepower per 100 hectares		
<b>II</b>	<b>Regression equation</b>	
$Y = 32,47 + 0,07X_1 + 0,25X_2 - 0,84X_3 - 0,61X_4 + 0,08X_5 - 0,16X_6 + 0,45X_7 - 0,17X_8 + 0,02X_9$		
<b>III</b>	<b>The most significant factors of direct influence:</b>	Elasticity coefficients
1	the proportion of women in the composition of the work force of agricultural organizations, in percent	$X_2 = 0,41$
2	the proportion of personnel working professions of agricultural organizations under the age of 30 years, as a percentage	$X_7 = 0,25$
3	the size of the energy capacity per 100 hectares of sown area of agricultural organizations, hp / ha	$X_9 = 0,23$
4	percentage of workers who do not have special vocational education, in percent	$X_1 = 0,09$
5	the proportion of working people older than working age in the composition of the work force of agricultural organizations, in percent	$X_5 = 0,03$
<b>IV</b>	<b>The most significant factors of reverse influence:</b>	
1	share of labor costs, in percent	$X_3 = -0,96$
2	number of hospital beds per 10,000 population, units	$X_6 = -0,51$
3	level of profitability, in percent	$X_4 = -0,31$

If there are differences in the units of measurement of factor signs, as a rule, elasticity coefficients are used. These elasticity coefficients show how much percent on average in aggregate the effective indicator y can change when the factor signs x change by 1% of its average value.

The average elasticities can be compared with each other and, accordingly, the factors are ranked according to the strength of their impact on the result.

As a result of the study, it was found that the key factors affecting the increase in the level of staff turnover in blue-collar occupations in agricultural organizations are “by module”: 1) the share of labor costs - 96%; 2) the number of hospital beds per 10,000 population — 51%; 3) the proportion of women in the composition of the work force of agricultural organizations - 41%; 4) profitability level - 31%; 5) the proportion of personnel working in professions of agricultural organizations under the age of 30 years - 25%; 6) the size of energy capacity per 100 hectares of sown area of agricultural organizations - 23%.

Since among the factors that we identified as a result of the correlation-regression analysis, it was found that the turnover rate is the proportion of labor costs, the relationship between the energy activity costs of workers in the agricultural sector and the level of their remuneration is studied.

Relying on the norms of physiological energy and nutrient requirements for various groups of the population of the Russian Federation (2009), developed by the Research Institute of Nutrition of the Russian Academy of Medical Sciences, put into effect on December 18, 2008, the cadres of working agricultural professions can be attributed to the highest groups of physical activity in men: group IV, which includes workers of heavy physical labor, including workers in forestry, hunting and agriculture, and group



V, especially heavy-duty manual workers, machine operators and agricultural workers in sowing and harvesting periods.

Calculations have shown that the working branches of agriculture cannot satisfy their need for good nutrition, which is necessary and sufficient for the reproduction of physical effort costs due to the low level of remuneration (Table 7).

**Table 7.** Indicators for assessing the level of income of the population in rural areas of the Republic of Bashkortostan and the energy value of food consumed for the period from 2010 to 2016 years.

Indicators	2010 y.	2011 y.	2012 y.	2013 y.	2014 y.	2015 y.	2016 y.
Consumer spending, per person per month, rubles.	6872.1	7230.9	11130.2	10800.5	12130.1	10189.3	12006.4
the proportion of consumer spending on the purchase of food and food out of home, in percentage	35.4	33.2	23.4	27.0	34.3	38.9	34.6
Consumer family expenses for the purchase of food per month, rubles.	7294.8	7209.0	7829.7	8755.8	12484.5	11901.6	12462.6
The cost of non-food items, per person per month, rubles.	2918.7	3304.0	6610.8	6019.3	5953.0	3961.2	5585.6
The size of the subsistence minimum (average per capita), rubles per month	5388.0	5992.0	6014.0	6789.0	7577.0	9175.0	9105.0
Average monthly wages of workers in agriculture, hunting and forestry, rubles.	8663.0	9939.0	10862.0	11571.0	13910.0	14635.0	15886.0
The energy value of food consumed per person per day, kilocalories.	3516.4	3407.5	3342.3	3231.4	3188.3	2823.1	3031.7
Required daily rate of consumption for agricultural workers, kilocalories.	3600.0	3600.0	3600.0	3600.0	3600.0	3600.0	3600.0
Under consumption of food, kilocalories.	83.6	192.5	257.7	368.6	411.7	776.9	568.3

The costs of workers' physical energy exceed the costs of specialists' physical energy by 1.6 times, and the costs of managers' energy - by 2 times. Regular non-receipt of the necessary and sufficient number of kilocalories for the reproduction of the costs of

physical and mental efforts due to low wages lead to an outflow of workers from the agricultural sector to more paid ones.

In fact, for the period from 2010 to 2016. in the Republic of Bashkortostan, the proportion of agricultural workers who received wages at a level below the subsistence minimum increased from 6.9% to 9.8%. In agriculture, the share of low-paid workers increased from 21.4% to 36.8%. This trend evolved in the country and its regions for a long time. In the structure of the energy value of the daily ration of home food of rural residents, the largest share is occupied by bread products - 40.5%. It is proved that in order to compensate for the costs of physical effort, a villager must eat calorie and properly, to achieve this, the wage level of a worker in the agricultural sector must increase at least 2-3 times.

## 4 Conclusion

**Firstly**, for the period from 1990 to 2016. the number of labor resources in the region increased by 4.5%, while the number of labor resources in rural areas increased by 17% over the same period.

**Secondly**, according to official statistics of the Republic of Bashkortostan, the number of personnel working in agricultural organizations for the period from 1990 to 2016. decreased by 8 times. At the same time, the number of released workers and employees in agricultural working professions decreased by 79%.

**Thirdly**, cadres of workers with special vocational education mostly leave the industry (51.6% migrated with secondary vocational education, 36.3% with general secondary education, 14.9% with higher vocational education, with the initial professional - 5.3%, with no indication of the level of education - 3.9%, with an incomplete higher education - 3.4%, with the main general - 1%, candidates of science - 0.8%.

**Fourthly**, a special correlation-regression analysis revealed the main factors affecting the turnover of workers in agricultural work. As a result of the study, it was found that the key factors affecting the increase in the level of staff turnover in blue-collar occupations in agricultural organizations: 1) the share of labor costs; 2) the number of hospital beds per 10,000 population; 3) the proportion of women in the composition of the work force of agricultural organizations; 4) profitability level; 5) the proportion of personnel working in professions of agricultural organizations under the age of 30 years; 6) the size of energy capacity per 100 hectares of sown area of agricultural organizations.

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## Innovations in the Chocolate Manufacture as Part of Polish Confectionery Industry

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**Abstract.** From the perspective of every enterprise operating in the agri-food industry it is very important to be competitive on the market and meet the requirements of consumers. Among all the branches in this sector, the Authors' attention was attracted by the confectionery industry due to the high growth dynamics of chocolate manufacture in Poland. The purpose of this article was to characterize the innovations introduced in Polish confectionery industry in the enterprises manufacturing this category of confectionery. The article uses information originating from the subject literature and the data collected from major enterprises involved in chocolate manufacture. Ten enterprises with the total of 90% share in the sale of the discussed products on Polish market represented the research objects. The study was carried out in the first half of 2018. The first part of the article defines the essence of innovations and identifies their types. Next the article presents the part of Polish confectionery industry focused on chocolate manufacture and provides examples of the applied innovations. The article is finalised with presenting development opportunities for the described part of confectionery industry along with identifying further research directions in the studied area.

**Keywords:** Innovation, Chocolate Manufacture, Confectionery Industry, Food Industry

### 1 Introduction

Currently innovations, and thus innovativeness, represent an important component in the focus of both entrepreneurs and science. They constitute one of the fundamental determinants influencing the development of individual companies as well as entire enterprises. They define the pace, directions of economic development and forms of international cooperation [18].

Innovative activities are undertaken by both large and smaller enterprises. The conducted research indicates, however, that small and medium enterprises are not as innovative as the large ones. An important reason for this situation is the narrower activity scope of smaller entities as compared to large enterprises having a more extensive offer and more modern manufacturing technologies [28].

In the course of recent twenty years Polish agri-food sector was subject to significant transformations. It is one of the industries which revived swiftly after the

crisis resulting from the political transformation. Thus, it also turned out a very important stimulating agent of economic growth. In addition, owing to the continuous development of technical, technological and organizational nature, Poland has reached the forefront of modern and innovative European food producers [5]. The agri-food sector covers many branches among which the following can be distinguished: fruit and vegetable industry, bakery industry, meat and fish industry or confectionery industry. The latter is particularly important due to its dynamic development. The sector covers approx. 350 producers, among which 100-120 companies employ over 50 people. The following major enterprises with foreign capital, manufacturing chocolate products on the Polish confectionery market can be listed: Nestle Polska, Mondelez International, Lotte Wedel, Ferrero and Mars Polska. Polish confectionery manufacturers have 20-25% share in Polish confectionery production. The most important confectionery producers with Polish capital include the following companies: Wawel, Mieszko, Colian and ZPC Otmuchów [29]. Among all confectionery industry categories, the chocolate industry appears to be interesting because of the growing chocolate manufacture in Poland, its diversity and the increase in chocolate consumption. The market range of products is continuously growing and includes bitter, milk and white chocolates, without additives, with additives and filled ones. It should, however, be noted that the level of chocolate consumption in Poland, despite its growth, remains relatively low comparing to such European countries as Switzerland or Germany. Moreover, the forecasts for this category are quite promising. Therefore, it stimulates further investments in this sector. Currently, the manufacturers are highly competitive for each other as they keep introducing new or improved products into their offer [6].

The purpose of the article is to characterize innovations implemented in the Polish confectionery industry focused on chocolate manufacture. In order to carry out the set objective the article was divided into the following parts, which:

- define the terms of “innovation” and “innovativeness” and also discuss the types of innovations,
- describe the Polish confectionery market and provide examples of innovations in enterprises manufacturing chocolate products,
- identify the directions for further research and trends in chocolate manufacture.

The article is based on the subject literature review and on the data collected from major enterprises manufacturing chocolate products on the analysed market. The empirical research method was based on case studies using direct observation and structured interviews with the representatives of selected enterprises. Ten enterprises with the total of 90% share in the sale of the discussed products on Polish market represented the research objects. The study was carried out in the first half of 2018.

## **2 Innovations and Innovativeness in the Subject Literature Perspective**

Each organization can be approached as part of the socio-economic system, distinguished for the realization of a defined goal, characterized by the specific tangible and intangible resources, which facilitate its achievement. Therefore, the following goals can be identified [22]:

- generating maximum profit,
- developing organizations in which profit is recognized as the measure needed for the implementation of developmental goals,
- creating value and passing it on to clients,
- co-creating value with clients in the experience-based environment.

In the rapidly changing environment, within which organizations operate, management should be focused on creating value for the client. Such defined goals result in creating modern strategies by organization managers approaching market as the best place for developing partnership interactions between organizations and clients [4]. It should also be observed that enterprises are continuously in need of the increasingly innovative solutions in order to retain their competitiveness on the market. Therefore, it seems obvious that the introduction of innovative products and services by organizations remains the most important condition for maintaining their market competitiveness [22].

J. Schumpeter is generally regarded the author of the concept of innovation. He identified innovations as the introduction of new products to the market, but also as the introduction of new production methods, entering new markets, acquiring new sources of raw materials or introducing new organization of industry. He also separated the meaning of such terms as “innovation” and “invention”, arguing that a large number of inventions will never turn into innovations, as they will not be introduced into production. On the basis of this concept various definitions of innovation were created approaching it as an absolute novelty or as an implementation of solutions developed by another entity. The latter approach is currently most often presented in the subject literature [19].

In accordance with the definition by A. J. Harman innovations consist in the introduction of new or significantly improved products or processes on the market. In turn, G. Silverberg stated that innovations are the result of internal factors, such as expenditure allocated by domestic business entities to e.g. investments in human capital development. In addition, he believed that owing to the well-trained staff, the innovative possibilities of business entities keep expanding and thus result in economic development [13]. In J. Parker’s opinion innovation is a process involving all activities which bring a new product or a production method into practical use. This approach strongly emphasizes the practical application of innovation [35].

According to P. F. Drucker innovation represents a specific tool in the hands of an entrepreneur, which makes the opportunity to provide new services or start a new business based on an introduced change. He perceives innovation as an economic or

social concept rather than a technical one, which is identified with changing the value and satisfying the consumer by means of using specific resources [23].

In the opinion of K. Z. Poznański the innovations related to social and organizational changes are ignored to the advantage of technical innovations, which are very important for the transformations in production and economic development. According to the author, not every new product or technology can be approached as an innovation [20]. Based on this definition the following types of innovation can be distinguished:

- technological, i.e. the ones which introduce new and improved services, e.g. just in time [20],
- process-based innovations characterized by the implementation of new or improved production or distribution technologies. They cover changes in technology, equipment, hardware and software, and also marketing solutions, such as product placement, product or price promotion [17].
- product-based – they refer to the development of new products or the modification of the existing ones. Such innovations can be developed as a result of new knowledge or technology. They can also be based on new possibilities using the already known technology. However, the meaning of the word “product” is understood as a physical good or service [1].
- organizational – they refer to consortiums or clusters. This type of innovation is based on the application of electronic cooperation platforms. In terms of the enterprise management aspect they cover changes in an entity organization or work organization. Such innovations have a positive impact on the organization of work and production, improve health and safety at work and also facilitate employee’s performance in the workplace [28].
- marketing – their scope includes the application of new marketing methods in an enterprise and also introducing a new packaging design of the sold products, new product placement on the market, new promotion methods or pricing strategies [32]. They also cover marketing strategy changes and the applied market impact instruments’ changes, which are very important for enterprises [9].
- financial, related to obtaining funds, e.g. for the development of transport and logistics infrastructure within structural funds as well as attracting public contractors for the respective activities [27].

The subject literature provides many typologies of innovation. The most popular one was presented in the Oslo Manual. Originally, this division also referred to the definition of innovation, which indicates that such activities consist of many research and technical nature factors or process and product-based innovations only. In turn, since 2005 four types of innovation have been distinguished: product-based, process-based, organizational and marketing ones [22].

The authors A. Pietroń-Pyszczyk and K. Piwowar-Sulej compiled different typologies of innovation focusing on the criteria of their division. In this respect the following innovations can be identified [19]:

- based on the field of activity they refer to (functional, objective, technological, organizational and ecological),

- related to technology (technological – process and product-based, non-technological – referring to services and marketing),
- based on their effect/scope of impact (process and product-based),
- based on the originality of changes (creative and limitative),
- based on the range of impact (internal innovations in an enterprise, innovations extending beyond an enterprise),
- based on the place of origin (domestic and foreign),
- based on the size scale and the range of effects (strategic and tactical),
- based on the psychosocial conditions of people implementing innovations (reflective, unreflective, intentional, unintentional),
- based on the stimulation mechanism (supply, demand-based).
- Innovations can also be divided in terms of [34]:
- an object – product-based, organizational, technological, marketing and social,
- the scale of changes – incremental and breakthrough ones,
- originality level – creative, imitating, seeming,
- changes complexity level – related, isolated,
- approach to the natural environment – ecological, indifferent, violating ecological balance, participants of the innovation process – coupled, uncoupled.

The concept of innovation is inseparably connected with the one of innovativeness. Innovativeness is understood as all activities involving the introduction of new products or technologies or the improvement of the existing ones. These solutions are supposed to contribute to the increase of not only economic, but also financial, technical and technological potential in the field of transport and logistics systems. The OECD (Organization for Economic Co-operation and Development) also formulated the definition of innovativeness, which indicates that such activity involves numerous factors of a research, technical, organizational, financial and commercial nature. Its goal is to develop and introduce new improved products and processes [27].

### **3 Chocolate Manufacture as a Part of Polish Confectionery Industry**

The confectionery industry produces goods, which are characterized by the use of a significant amount of sugar and sugar substitutes. They are generally low in micronutrients, but rich in calories and carbohydrates. The confectionery industry consists of three categories: chocolate confectionery, sugar confectionery and gum products.

The confectionery market in Poland is growing faster than any other food industry sectors. Based on the Nielsen report, in the course of twelve months, from September 2016 till September 2017, it recorded an increase of 5.8%, with its value reaching PLN 17.3 billion [24]. In the analysed period, the largest increase was observed in the category of chocolate products – 6.3%. This category covers chocolates, pralines, bars and figurines and also chocolate sets. Although the sale of the latter product type amounts to only 9.4% of the entire category value, it is characterized by the sales



highest growth rate, which presents the level of 13.9%. The increase in sales is confirmed by the research conducted by the analysts from one of the banks operating in Poland, who state that the consumption of chocolate products in Poland has increased by 122% over the past five years and currently amounts to 6.3 kilograms per person [26].

These results are identical with global trends on the chocolate market, which is characterized by one of the most dynamic increases in sales value. According to Euromonitor International, the world's leading independent provider of strategic market research, it recorded an increase of 13% in 2010-2015 and reached the value of 101 billion dollars [3]. As reported by the World Cocoa Foundation, the annual consumption of cocoa beans exceeds three million tons and the global demand for this raw material is continuously growing. The discussed situation is the consequence of growth in demand for chocolate products on the emerging markets. For this reason, the chocolate market remains highly attractive for manufacturers and is characterized by high level of competitiveness. In turn, operating on this market involves high risk. Manufacturers of chocolate products face numerous challenges, of which the major ones include price rise of the main ingredients used in production, i.e. cocoa beans, milk, sugar, fat and oils, nuts or almonds, and the increase in labour costs.

Cocoa beans is the main ingredient in the production of chocolate. Its growing price results from the declining availability of this raw material. The Mars Incorporated warns that by 2020 the cocoa beans deficit could grow up to one million tons per year, i.e. fourteen times more than the respective deficit level recorded in 2013 [12]. In the long-term perspective it can amount to 2 million metric tons. This level can be reached by 2030 [11]. In addition to the increasing consumption it also results from the specific method of cocoa beans production. 70% of the total world production originates from West Africa (Côte d'Ivoire, Ghana, Nigeria and Cameroon). In this region, cocoa is grown by small entrepreneurs who use extensive cultivation methods. A further increase in the production of cocoa has to result from higher productivity of the existing mature trees and the replanting of old unproductive cocoa farms [33].

Growing labour costs represent yet another challenge. In the last twenty-eight years Poland has become one of the most important manufacturers of chocolate products worldwide as a result of extensive foreign investments in this branch of the food industry. In the years 1991-1998 the level of foreign investments amounted to 980.5 million US dollars, of which as much as 40% was spent on greenfield investments, i.e. the construction of production plants from scratch [31]. This situation was caused by the huge potential of the confectionery market in Poland and the desire of global producers to gain a good market position by brand building in the minds of customers and selling their products. In addition, the discussed investments were supported by the situation on the labour market, high unemployment rate and low level of salaries earned by Poles. In 1996 the total annual labour cost per one employee in Poland amounted to USD 5,424.00 and was six times lower than in the European Union countries, where it reached USD 33,572.00. In addition, the unemployment rate in Poland, in the same period was at the level of 14% [8]. Another important stage in the development of the confectionery industry was observed after Poland's accession to the European Union (EU). Lifting customs borders and still relatively low labour costs allowed global

corporations to increase product margins by transferring production from Western Europe to Poland. The level of foreign investments in the food industry in Poland went up from EUR 1,270 million in 2005 to EUR 1,915 million in 2015 [7]. A large percentage of these funds was addressed to enterprises operating on the confectionery market, which in the same period recorded an average annual growth at the level of 4.4% [16]. As a result of these investments, the export of confectionery products manufactured in Poland increased by 79.5%, i.e. from EUR 1.66 billion up to EUR 2.98 billion, and Poland turned into one of the leading confectionery exporters worldwide, with the share of 4.8% [10]. Unfortunately, the situation has changed for confectionery producers in recent years along with the significantly declining unemployment rate, as registered by the Central Statistical Office. In 2005 it was 17.6%, whereas in 2017 went down to 6.6% [8]. This change resulted in the fact that the labour market in Poland was redefined and is currently referred to as an employee market and the companies operating on it must compete with each other to provide the necessary resources for running their own business. Higher demand for employees affected the total labour cost, which in the corresponding period increased from 17,319.00 USD [2] up to 31,930.88 USD [25].

Consumer expectations represent an equally important component, influencing the strategy of chocolate manufacture development. One of them is related to the trend of shifting consumption towards healthier products. Despite the fact that as many as 87% of consumers are predominantly guided by the product taste and the main motivator of chocolate products' consumption is the desire to enjoy it, consumers are still looking for healthier alternatives as a result of healthy lifestyle being intensely promoted in the media. These trends are supported by the government units, which issue stricter provisions and regulations, resulting from the public debate on health problems related to fats and sugar. In connection with the above, manufacturers launch products based on natural ingredients and supplemented with healthy additives, such as e.g. whole grains. Due to the increasing life intensity and free time limitations, the growing role of snacks in a daily diet can be observed on the confectionery market. For this reason, the availability, consumption convenience and the portion size also represent important factors when choosing a product. To sum up the above discussion, it can be stated that the key factors in the development of the chocolate market offer are pleasure, health and convenience. These components also fully reflect the expectations important for the Polish consumer.

#### **4 Examples of Innovations Taking into Account Different Typologies of Innovations**

In order to identify trends in the field of innovation development related to chocolate manufacture in Poland, the research was carried out covering major enterprises running the discussed business and operating on the chocolate and confectionery market. Due to the fact that the problem of innovation in relation to food industry enterprises, and specifically to the manufacturers of chocolate and confectionery products is a new issue, the main method of empirical research consisted in carrying out case studies

realized using direct observation and structured interviews with the representatives of selected enterprises. Based on the conducted interviews it was observed that innovation represents one of the main areas of interest for entrepreneurs and constitutes an important pillar in developing a given company strategy and position on the market. As a result of the carried-out research, a wide spectrum of different types of innovations was identified, which were implemented by enterprises manufacturing chocolate products. These innovations can be classified using various division determinants. In order to show their full complexity, the table below presents examples of the implemented innovations along with various typologies assigned to them.

**Table 1.** Examples of innovations in enterprises manufacturing chocolate products.

Innovation typology	Implemented in chocolate manufacture
Technological Process-based Creative Internal	The application of near infrared (NIR) spectroscopy in chocolate crystallization characteristics by the global chocolate manufacturer with seven plants operating in Poland.
Technological Process-based Limitative	<p>The automation of production processes through using robots in lining the mouldings for packaging boxes of chocolates, for packaging these boxes in multipack cardboard boxes and for palletization – an enterprise from Lower Silesia, employment reduction, savings of approximately 255 thousand dollars.</p> <p>The investment in an innovation in the field of transmission and automatic packaging of the finished product in the central packaging room – an enterprise from Warsaw.</p> <p>The development of a solution for the automatic packaging of chocolate pralines in single flavour chocolate boxes – an enterprise from Lower Silesia, a significant reduction of the packaging line staff from thirty to ten people and savings of 670 thousand dollars.</p> <p>The implementation of the “future line” for the production of various types of chocolate products without the need of refitting, higher efficiency of the production process, the reduction of losses resulting from the processing line downtime – an enterprise from Opolskie region.</p> <p>The application of a cold stamp method for the production of filled chocolate products – an enterprise from Opolskie region.</p>
Technological Product-based Creative	The development of a ruby chocolate recipe characterized by a new ruby colour and berry-like flavour with a slightly sweet and sour note – a producer from Łódzkie region [14].
Technological Product-based Creative Functional Demand-based	<p>The development of a milk chocolate recipe with high content of cocoa, a mixture of milk and bitter chocolate, which turns milk chocolate into a product characterized by higher nutritional value – a global chocolate producer with seven plants operating in Poland.</p> <p>The development of a new category of confectionery combining chocolate and cookies – “chocobakery”, a combination of shortcrust pastry with smooth and creamy chocolate texture, in this category of products a cookie plays a functional role, i.e. reduces light hunger and is the source of good ingredients, such as grains rich in nutritional value, which is valuable for the body, whereas</p>

Technological Product-based Limitative	chocolate is the synonym of pleasure and reward – several chocolate manufacturers. The implementation of a new packaging system for the chocolate mix products “pic and mix” – a consumer can compose his/her own mix in the store. The implementation of heat sealing packaging for chocolate bars, replacing the traditional packaging made of aluminium foil and paper – several chocolate manufacturers. The reduction of portions by implementing miniature versions of the existing chocolate products, i.e. the so-called “bite size” – e.g. a miniature version of popular wafers produced in Kalisz, packed in bags.
Organizational Creative Strategic	The support for cocoa supply chain through the “Cocoa life programme” aimed at supporting the cocoa growing communities: broadly understood development, promoting entrepreneurship, empowering women and children by providing high quality education – a global chocolate producer with seven plants operating in Poland.
Organizational Creative Strategic Ecological	The implementation of improvements in monitoring pests causing 40% cocoa beans yield losses through carrying out the “Integrated Management of Cocoa Pests and Pathogens in Africa” project aimed at increasing the productivity of cocoa farms and protecting the industry against cocoa beans deficit on the market [30] – the global producer of chocolate with seven plants operating in Poland.
Organizational Creative Tactical Organizational Creative Tactical Ecological	The development and implementation of the original project management method connecting traditional and agile methods combined with high efficiency systems [21]. The implementation of Lean Manufacturing philosophy known from the automotive industry, aimed at waste reduction and eliminating unnecessary operations and procedures in the production process. It facilitates the reduction of waste generated in the chocolate manufacture process, which results in lower production costs and reduced consumption of raw materials. This philosophy supports manufacturing the highest quality products in response to consumers’ expectations [15].
Organizational Limitative	The centralization of processes related to the development of products through the creation of global research and development centres – a global chocolate producer with seven plants operating in Poland.

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## 5 Conclusion

Chocolate manufacture enterprises face numerous challenges and therefore are highly interested in implementing various types of innovation. They remain fully aware that without them they may lose their current position on the market. The conducted research shows that a greater emphasis is placed on technological innovations, which are approached as a response to the current needs of consumers, on product-based innovations or process-based innovations resulting from the current macroeconomic situation. Only a few of the surveyed enterprises are active in the field of organizational

and management type of innovation. Enterprises should focus their efforts on the activities related to the implementation of these innovations which not only allow better adjustment of products to consumers' needs, but above all on the ones which enable price risk management of raw materials and support the re-engineering of products, thus allowing to meet consumers' needs along with reducing costs. The Polish market of chocolate products has taken advantage of its chance and is developing very dynamically, also owing to the already implemented innovations. In the face of changes occurring in the macroeconomic environment, the enterprises manufacturing chocolate products should intensify their activities in the field of organizational innovations, which support increasing their competitiveness and strengthen their market position.

The above studies indicate new trends in the field of innovation in the confectionery industry in the sector of chocolate manufacture enterprises. They can serve as an example and result in defining a new direction of innovation development towards organizational or ecological typology. At the same time, they can be used as the commencement of research on motivational factors for the development of innovations within these typologies. During the conducted structured interviews, the representatives of enterprises easily listed the benefits of implemented technological innovations – new products' sales growth, higher market share, savings in labour costs, the reduction of losses resulting from the processing line downtime or the generated waste reduction. In the case of organizational or ecological innovations this type of argumentation either did not appear or was difficult to measure.

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# The Relationship among Foreign Trade Structure, Opening Degree and Economic Growth in the Western Region

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**Abstract.** Through the study of the interaction among the foreign trade structure, degree of openness and economic growth in the western region (except Tibet) of China, this paper finds that the export of labor-intensive products has a significant effect on promoting the opening degree of the western region, while the export of primary products has no obvious effect. But both labor-intensive products and primary products are important driving forces for economic growth. The development of capital-and technology-intensive industries is no significance, and their exports have little impact on opening degree and economic growth. Therefore, the western region should optimize the structure of foreign trade, vigorously promote the development of capital-and technology-intensive industries, continually promote the construction of foreign trade demonstration, and give priority to the development of local specialty industries

**Keywords:** Foreign Trade Structure, Degree of Openness, Economic Growth.

## 1 Introduction

Since 2007, the economic growth rate of the western region has surpassed the eastern region for 11 consecutive years and is in the period of medium-to-high speed development opportunities. In terms of total amount, the GDP of western region increased from 12.7 trillion to 17.1 trillion yuan from 2013 to 2017, accounting for 20% of the country's total, with an average annual growth rate of 8.8%. In terms of provincial development, the GDP growth rate of Guizhou, Tibet and Yunnan are the top three provinces across the countries in 2017, the first two of which are the only provinces in China to achieve double-digit GDP growth. The development and opening up of the western region has always been the focus of development, but the degree and level of opening to the outside world is relatively low, which is still the "short board" in the layout of China's regional opening up. In terms of foreign trade and investment, the western region accounted for only 6.8% of the total foreign trade, 10% of the usage of foreign capital and 7.7% of the total foreign investment in 2017. The export products are mainly transformed from resource-intensive to labor-intensive, and the export of



machinery and electrical equipment has grown rapidly, while its international competitiveness is not strong. The development of the western region in the future will focus on further opening up. The promotion of the Strategy of Developing the Western Regions, implementation of the "One Belt and One Road" initiative and establishment of the third batch of pilot free trade zones have brought significant opportunities and policy support for the economic development of the western region.

## **2 Literature Review**

Foreign scholars mainly study the relationship between foreign trade structure and economic growth. Some scholars believe that foreign trade contributes to economic development through empirical study [1, 6, 10]. Some analyzed the relationship between financial development, trade openness and economic growth and the relationship between the three is given from different perspectives.

Domestic scholars mainly study from two aspects. One is to study the influence of export commodity structure and trade mode on economic growth. Some found that the optimization of export commodities structural can promote economic growth through empirical research [7, 16]. And some proposed that the optimization and adjustment of foreign export trade structure is helpful to achieve high-quality economic development of a country [2]. The second is to study the impact of the degree of openness on economic growth. Some concluded that there are obvious differences among regions through the study of the relationship between the degree of openness and economic growth in China's three major regions, the reason for which is different degrees of opening up [9, 13]. Some took all provinces of China as the research objects and believed that the degree of openness can promote economic growth [5, 15]. And some draw the conclusion that the opening up of the western region contributes to economic growth based on the Strategy of Developing the Western Regions [18].

To sum up, the academia has done more in-depth research on the above two aspects, but little research has been conducted the relationship among foreign trade suture, opening degree and economic growth at the same time, especially the relationship between foreign trade structure and openness. In recent years, with the implementation of Strategy of Developing the Western Regions, the economy in the western region has achieved rapid growth. The level of opening up and high-quality development of the economy in the western region have always been focused by all social sectors. In view of this, this paper aims to explore the relationship between foreign trade structure variation and opening degree through empirical analysis of the relationship among foreign trade structure, opening degree and economic growth in the western region, in order to achieve high-quality economic growth by high-level opening up.

### 3 Empirical Analysis

#### 3.1 Data Selection and Variable Description

The data of this paper are selected from western provinces between 2006 and 2016. Given the lack of data in Tibet, this paper only covers 11 provinces (cities) in the west, and those data are from Statistical Yearbook, Statistics Bureau and Business Department of each province (city). The reason why the research time was selected from 2006 to 2016 is that since China's accession to WTO, the degree of economic globalization has further deepened, and China's dependence on foreign trade has increased rapidly. In 2002, it exceeded 50%, increased to 63% in 2005, and even reached the highest 67% in 2006. Since then, it has been deeply affected by China's economic transformation, structural adjustment of internal and external demand, and financial crisis. From 2007, the dependence on foreign trade has gradually declined. In addition, since 2006, China's transition period won in the WTO negotiations will basically end, that is, the highest level of market opening will be achieved, all non-tariff measures will be eliminated, and most product tariffs will fall to the promised end point for a long time. Based on the above two points, this paper believes that 2006 is a dividing line for western regions, so the data of this paper are selected from 2006.

The core variables in this paper are the structure of foreign trade, opening degree and economic growth. The structure of foreign trade is divided by the proportion of different trade classifications amount in the total amount. The trade classification of this paper, drawing on the articles of some scholars[4,14], is divided according to the Standard International Trade Classification (SITC) principle of the United Nations, and we further divide the SITC into three categories, which are primary products, labor-intensive products and capital and technology-intensive products respectively. The opening degree is measured by the degree of utilization of foreign capital, and the economic growth is measured by the gross domestic product. The specific variable information is shown in Table 1.

**Table 1.** Variable information.

Name of variable	Abbreviation of variable	Standard of measurement
Primary product share	prir1	primary exports / total exports
Labour intensive product share	laborr1	export of labour intensive products/ total exports
Capital technology intensive products share	capital1	capital technology intensive exports / total exports
Opening degree	fdir	foreign investment in China /GDP
Economic growth	lnGDP	gross domestic product
Tourism income	tourist	hundreds of millions yuan
Patent authorization	patent	term
	fdifirm	each

Number of foreign invested enterprises	fixedinvest	hundreds of millions yuan
Investment in fixed assets of the whole society	urban	Percentage
Urbanization level	industr	Percentage
Industrial structure	railway	Ten thousand kilometers
Railway mileage		

### 3.2 Analysis of the Impact of Foreign Trade Structure on Opening Degree

The change of foreign trade structure has different impacts on the opening up to the outside world. By analyzing the change of foreign trade structure in the western region, we can better grasp the development trend of foreign trade, and the influence of it on opening degree can also provide a clear idea for us to discuss the opening up of the region. Based on the influence of the export changes of primary products, labor-intensive products and capital technology-intensive products on the opening degree, this paper conducts modeling and determines the relationship between variables. Before the regression, Hausmann test of the panel model is conducted, and the random effect model is adopted in the study of the relationship between the proportion of primary product exports, the proportion of capital technology-intensive product exports and the opening degree, while using the fixed effect model to study the impact of labor-intensive products exports' proportion on the opening degree. On the basis of those, a regression is made. The model built in this paper is:

$$Fdir_{it} = \alpha + \beta X_{it} + \delta Z_{it} + \varepsilon, \quad (i=1,2,\dots,n; t=1,2,\dots,T) \quad (1)$$

Among them,  $X_{it}$  is the core independent variable, which is the proportion of primary product exports, the proportion of labor-intensive product exports, and the proportion of capital technology-intensive product exports;  $Z_{it}$  is a series of control variables;  $\alpha$  is a constant coefficient;  $\beta$  is the independent variable coefficient;  $\varepsilon$  is a random disturbance term. After the Houseman test, the corresponding regression information is shown in table 2.

**Table 2.** Impact of foreign trade structure on the opening degree.

	fdir	fdir	fdir	fdir	fdir
prir1	-0.0029	0.0054			
laborr1			0.0505***	0.0346***	
capital1				-0.0250***	-0.0134**
tourist	0.0003		0.0003		0.0003
patent	0.0001**		0.00003*		0.0001***
fdifirm	3.56e-06		0.0001		0.0001
fixedin			0.0004		-0.0001
vest	-0.0001				

urban		-0.0627***		-0.1375***		-0.0428
industr		0.1052**		0.0542*		0.1008***
$\alpha$	1.3047***	-1.7318	-0.4968*	2.4631	2.5629***	-1.6353
$R^2$	0.02	0.66	0.01	0.1	0.04	0.65

Note: \*, \*\*, \*\*\* represent that the variables are significant at the significance level of 10%, 5% and 1% respectively

The second, fourth, and sixth columns of table 3 are regression results without control variables, while the third, fifth, and seventh columns are regression results after adding control variables. It can be seen that the export of primary products has no significant impact on the opening degree of the western region. After adding the control variables, the coefficient is adjusted to a positive value, that is, the impact is positive but still not significant. There may be other factors that influence the opening-up are separated to adjust the results. The labor-intensive products in the western region have a significant positive impact on the degree of opening to the outside world. At the same time, the patent authorization and industrial structure also have a significant positive impact on it. However, the number of foreign-invested enterprises, fixed asset investment and tourism income also promote the opening-up to the outside world, but not significantly. The reason may be that western regions are less attractive to foreign investment. Therefore, the rate of investment in the western region is low, and the influence on the opening-up. In addition, fixed asset investment in the western region is still insufficient, so its impact on opening-up is also weak. The main focus of tourism is to attract domestic tourists, and international tourism business development is weak. Capital and technology-intensive products have a negative impact on opening-up. The possible reasons are that the financial industry in the western region is developing slowly, the level of technological innovation lags behind due to the low capital concentration, and exports of products with technical content have not been recognized abroad. It can also be seen from table 3 that patents and industrial structure play a positive and significant role in promoting the improvement of opening-up, while the urbanization process has an inhibiting effect on enhancing the openness to the outside world, which may be caused by the slow urbanization process in the western region.

### 3.3 The Evolution of Dynamic Relationship Between Opening up and Economic Growth

There are many factors that promote economic growth in a region. This paper examines the relationship between them from the perspective of opening up. Since the current economic growth will be affected by the historical level of previous economic growth, this paper uses differential GMM to construct a dynamic model of economic growth to measure the relationship.

$$\ln GDP_{it} = \alpha + \rho_1 \ln GDP_{i,t-1} + \theta fdir_{it} + \gamma Z_{it} + \varepsilon_{it} \quad (2)$$

$\ln GDP_{i,t-1}$  is lagging variables of economic growth,  $fdir$  is the core independent variable, and  $Z$  is a series of control variables. This paper considers tourism development, patent

authorization, number of foreign investment enterprises, fixed assets investment, industrial structure and railway mileage will have an impact on regional economic development, so these variables are added here to control. After the differential GMM regression results, the paper also carried out the sequence autocorrelation and over-identification test, and the models passed the test, so the rationality of the modeling can be judged

**Table 3.** Dynamic relationship between opening up and economic growth.

	lnGDP
lnGDP(L1)	0.8478***
fdir	0.1
tourist	0.0001
patent	5.35e-06*
fdifirm	2.51e-06
fixedinvest	-0.00001
industr	0.0179***
railway	0.00003
$\alpha$	0.3934

Note: \*, \*\*, \*\*\* represents significant at the 10%, 5% and 1% level

As can be seen from table 4 lagging economic growth has a positive impact on the current economic growth and is significant at the 1% significance level. The degree of openness has a positive impact on economic growth, but it is not significant. In addition, the tourism industry, patent authorization, number of foreign investment enterprises, industrial structure and railway mileage have a positive impact on economic growth, and the impact of patent authorization and industrial structure is significant. The impact of fixed asset investment on economic growth is negative, but the impact is relatively weak

### 3.4 Analysis of the Relationship between Foreign Trade Structure, Opening up and Economic Growth

According to the above results, the proportion of primary product exports has a positive impact on the opening up of the western region, but not significant, and the export of labor-intensive products has a positive effect on improving the opening up of the western region. It also has a joint role in promoting regional economic growth.

Based on the backward technology level, the underdeveloped financial industry and the weak capital accumulation in the western region, primary products and labor-intensive products have always been the support of the development of the western region. The labor cost in the western region is low, and the threshold of industrial settlement is lower than that in the middle and Eastern region. Therefore, a large number of raw material-intensive products and foundry factories have been placed in the west, which has solved a large number of employment problems on the one hand,

and accelerated the external relations and regional economic development in the west on the other hand.

The development of capital-intensive industries is relatively slow in the western region, which has many factors. The lack of high-skilled human capital in the western region, low return on capital, and weak infrastructure have constrained the settlement and development of capital-intensive industries. If the western region wants to rely on high value-added capital-intensive products for external development, it needs more capital and technology as well as talent accumulation, and chain-driven comprehensive development can better promote the region's economic development of high quality.

Foreign trade structure, opening up and economic growth are mutually complementary parts. The rational allocation of regional foreign trade structure plays a key role in the region's "going out". This requires the region to rely on regional characteristics and show regional competitive advantages. From the depth and breadth, we will further broaden our opening up to the outside world, strengthen cooperation with outside world, make use of the "B&R" initiative to build China's economic, cultural, foreign trade, tourism and other links to the west, and build a complete infrastructure to lay the foundation for the economic development of the western region to Central Asia and other places.

## **4 Further Discussion**

### **4.1 The Trend of Foreign Trade Structure in Western China**

This paper attempts to further explore the development of foreign trade structure in the western region in order to find out the trend of foreign trade structure changes in the western region, so as to provide more comprehensive predictions and suggestions for the opening up and economic development of the western region. In 1999, the central government began to implement the strategy of developing the western region. This is a relatively profound transformation for the western region, this means that the central level began to narrow the gap between the central and western regions and improve the speed and quality of economic development in the western region. Therefore, the analysis of the development of foreign trade structure in the western region is from 1999 to 2016.

It can be seen from relevant data that the development trend of the three major trade categories of 11 provinces (cities) in the western region from 1999 to 2016, the proportion of capital technology-intensive products, indicating that the attraction of technology and capital in these regions is stronger than others. The larger proportion of labor-intensive products in Qinghai and Xinjiang reflects the advantages of the product processing industry. In general, the proportion of resource-intensive industries in 11 regions is lower, while the labor-intensive industries and capital-intensive industries are more active. It can be concluded that the distribution proportion of trade development pattern in the western region is more reasonable. But in the long run, labor costs are constantly increasing, and the western region will eventually lose the advantage of cheap labor. Capital-intensive products have high added value and low

pollution. Therefore, all provinces and cities should develop capital-intensive products, improve the quality of the products, and gain more market recognition.

#### 4.2 Summary of Demonstration Bases for Foreign Trade in the Western Region

In order to promote foreign trade and consolidate and enhance China's status as a major trading country, the state decided on the work plan of the professional demonstration base for the transformation and upgrading of foreign trade in 2011, aiming at promoting the establishment of a national demonstration base for foreign trade. This paper refers to some literatures and relevant data analysis [17], the number of national foreign trade demonstration bases in Inner Mongolia, Sichuan, Chongqing, and Guangxi is large, and the ten bases in Inner Mongolia far exceeds the number in other provinces and cities, reflecting the high expectations for development of foreign trade. Furthermore, the industries on the list of bases are mainly concentrated in the agricultural products, textiles and clothing, new materials, and pharmaceutical industries. In general, the key support for foreign trade relies on the development of agricultural products with special local characteristics, such as liquor in Guizhou, flowers in Yunnan, mustard in Chongqing, apples in Shaanxi and Gansu, beef in Inner Mongolia, and so on, which means that localities take advantage of comparative advantages when engaging in foreign trade. With the implementation of the “B&R” propose and access of all western provinces to foreign markets, enterprises should take this advantage and increase the added value of agricultural products to extend the industrial chain. The textile and apparel industry is mainly concentrated in the provinces of Inner Mongolia, Ningxia, Sichuan, Chongqing, and Shaanxi. Inner Mongolia, Ningxia have advantages in natural conditions for textiles and clothing, and Shaanxi and other places have a long history of textile production. The textile and apparel industry is also a light industry; investment is less than in heavy industries but at the same time it can generate a large number of jobs. Therefore, when various factors are considered, it is clear that there is support for.

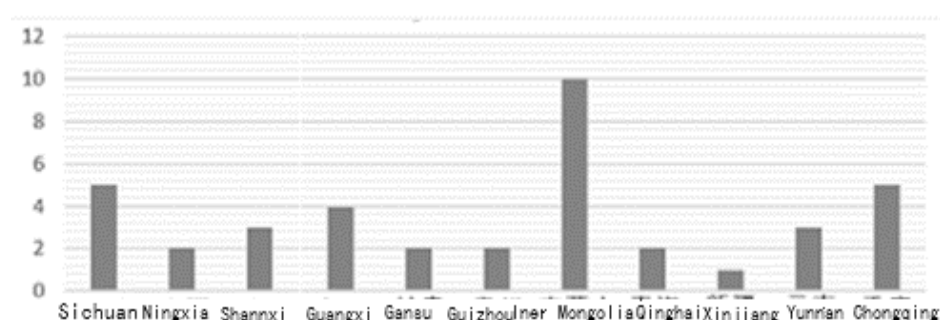
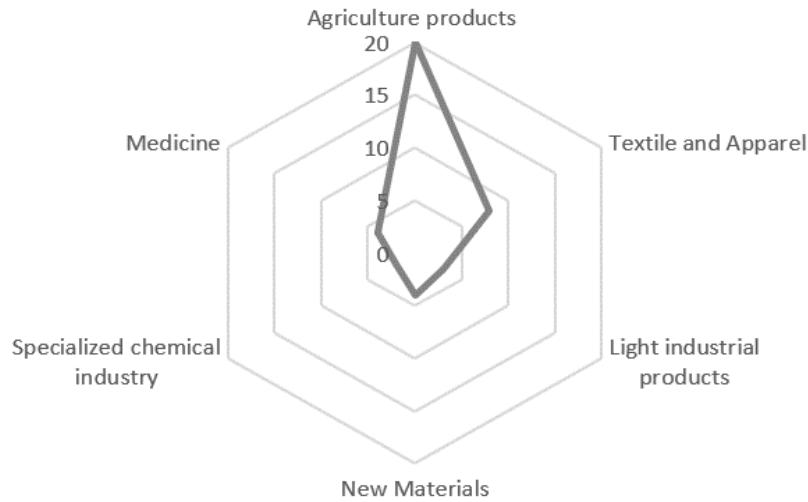


Fig. 1. Number of demonstration bases for foreign trade in the western region in 2018.



**Fig. 2.** The Field of demonstration bases for foreign trade in the western region in 2018.

## 5 Conclusions

The main conclusions of this paper are as follows: the export of labor-intensive products plays a positive role in promoting the opening up of the western region, while the export of primary products does not play a significant role in improving the opening up of the western region, but both are important driving forces for the economic growth of the western region. The capital-intensive industries in the western region are developing slowly, and their product exports have little impact on the degree of openness and economic growth, but it represents an important direction for industrial transformation in the western region. Therefore, in the future development strategy, we should further optimize the foreign trade structure, vigorously support the development of capital-intensive industries, extend the industrial chain and increase the added value of products. Western regions should continue to promote the development of transformation and upgrading of the demonstration base for foreign trade. According to the comparative advantage of the local industrial development, we should develop the characteristic foreign trade industry, for example, Shaanxi focuses on the development of the apple, textile and non-ferrous metal materials industries, while Ningxia focuses on the production of cashmere and wolfberry products.

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# The Model of Managerial Decision-making on Investment in Medium-sized Enterprises

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**Abstract.** The paper focuses on the definition of the model for managerial decision-making on investment in the medium-sized enterprises. The model consists of activities such as the identification of the problem or an opportunity, definition of the objective and variants of the problem's solution, determination of criteria, appraisal, and the subsequent selection where this is based on the enterprise's strategy. The model includes also the factors affecting this process (market's development, customers, employees, enterprise's owners and their relationship to the process, and others) and the resources necessary for this process (personnel, knowledge, finance, time, and information). The whole process is designed based on the conducted research comparing the successful enterprises in relation to the investment with those less successful ones. Among the fundamental findings affecting the designed model belongs the importance of linking the enterprise's strategy with the process of decision-making on investment in the successful enterprises, focusing of these enterprises mainly on the non-financial criteria during the appraisal of variants (impacts of the investment on the products and internal processes, on employees, and the previous experience), preferring the traditional methods for the appraisal of the economic efficiency of investment projects, and the absence of assessment of the risk level of the investment projects mainly in the less successful enterprises.

**Keywords:** Managerial Decision-making, Investment, Medium-sized Enterprises.

## 1 Introduction

The managerial decision-making on investment in its substance links the theory and practice of enterprises' management with the field of investment appraisal which deals with the efficiency of investment according to the specific methods used here. These two fields meet in the process when the managers or the owners of enterprises need to make decisions related mainly to the acquisition of new items of the fixed tangible or intangible assets. The definitions of the decision-making process within the management of enterprises reflect the opinions of the authors and academics. Therefore, this process can encompass various numbers of consecutive steps, often with a feedback for the previous steps. Or the individual steps create a closed cycle which is periodically repeated. According to some opinions, the process of the decision making

in management is divided into several phases that include the particular activities. A brief overview and comparison of these opinions follows below. The investment appraisal theory and methods are used to assess the efficiency of the investment. The methods here are static or dynamic, depending on whether the time is being considered in the calculations. The results of the methods used within the investment appraisal serve as the guidelines for the decision-making process. However, they often only cover the strictly economic aspects of the matter. To make the decision-making process and the selection of the right investment project more complex, other aspects need to be taken into consideration as well.

The process of managerial decision-making can be found at all managerial levels. However, the decisions being made at the strategic level has a significant impact on the business success and further orientation of the whole enterprise. Therefore, the process of making decisions on the investment of enterprises needs to be studied in a thorough way. According to Simon [17], the decision-making process can be divided into four phases: analysis of the environment for the identification of the conditions triggering the need to make a decision, definition of possible solutions, selection of the variant which best fits the requirements, and the assessment of the benefits and fulfilment of the objectives. This process is described as cyclic since the assessment of results can initiate a new decision-making process. The cyclic character of the decision-making process is supported by the opinion of Fotr et al. [6]. According to these authors, the process has eight individual phases, but the last two actually represent a part of the investment project's realisation and its monitoring.

The division of the decision-making process into four phases can be found also in the work of Nutt [13]. Within the definition of the fundamental steps of the decision-making process itself, the opinion of Rue and Byers [16] is in concordance with the description done by Nelson and Quick [12]. Thus, the fundamental steps of the managerial decision-making include the identification of the problem or needs to make a decision, definition of the objective, identification of possible solutions to the problem defined, testing of the correctness and efficiency of individual variants, and the most important part consisting of the selection of the best solution.

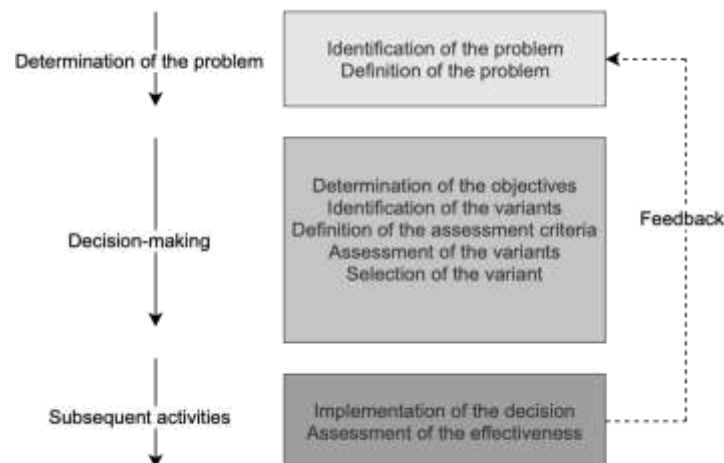
According to Blažek, the process of decision-making has six phases [2]. It starts with the definition phase, where the emphasis lies in the defining of the desirable future state in the form of an objective. This is followed by the analysis phase consisting of the gathering and proper interpretation of the information needed for the decision-making. The phases of generating possible variants should reveal the possible ways of achievement of the objective defined earlier. Then, these variants are sorted, assessed, and, finally, the decision is made as a binding selection from the variants. The distinguishing of six phases or steps within the process of managerial decision-making can then be found also in the opinions of Gibcus [8] and Bazerman [1]. Bazerman specifically pays attention to the differentiation of the assessment criteria within the process based on their perceived importance in the form of weights that are assigned to them. Pike and Neale deals specifically with the decision-making process in relation to the financial decisions. [14]

All of the above-listed opinions and characterisations are in harmony with the point of view presented by Donnelly, Gibson and Ivancevich. However, these authors add

the perspective of benefits of the decision made for the individual stakeholder groups. This is an important issue to be included in the process of the managerial decision-making on investment. Essential is to clarify which stakeholder groups and their specific interests will be considered during the decision-making process. Adding too many different perspectives can make the process too complex. On the other hand, omitting an important perspective for a particular situation can lead to the selection of a variant that will not bring the desired results. [4]

Robbins and Coulter in their description of the process build on the approaches listed above and distinguish eight steps. These steps represent all the important activities, starting with the identification of the problem. This is followed by the determination of the criteria, assignment of the weights to these criteria, definition of solution's variants, analysis of the variants, selection of the best one, implementation of the decision, and, finally, by the assessment to the effectiveness. [15]

Despite the fact that the opinions of various authors on the individual steps and parts of the managerial decision-making process vary, the common features can be identified. The whole process can be divided into three substantial parts. The first one deals with the definition of the problem, the second one is focused on the core of the decision-making, and the last part includes the implementation of the decision (the selected variant of the problem's solution) together with the assessment of its effectiveness. This division of the process is depicted in Figure 1.



**Fig. 1.** The process of the managerial decision-making.

The theory and methods within the field of investment appraisal intersects with the topic of the managerial decision-making. The main intersection is represented by numerous methods for the calculation of the economic efficiency of the investment projects. This is an area that attracts the attention of many academics, researchers and other professionals. To follow the purpose of our paper, we will not present a complete overview of it. In general, the methods used here are divided into the static and dynamic ones regarding the fact whether they consider the present value of money and whether they try to incorporate the risk into the appraisal of the investment. In relation to this,

Lefley points out the existing disagreement between the academics and practitioners. Among these groups, mainly the net present value (NPV) and the internal rate of return (IRR) are being used. However, the author introduces the “marginal growth rate” (MGR). According to him the managers should use the NPV and the MGR. [10]

Espinoza suggests an alternative method for the appraisal of economic efficiency of investment as well. This is noted as the decoupled net present value (DNPV). The point is not to use the utility theory for decreasing the value of future cash flows, but to focus on the risk associated with the investment project [5]. As it was mentioned earlier, the methods of investment appraisal consider mostly only the economic criteria. However, the investment projects and their results could be assessed from many other perspectives. Weninger and Huemann put emphasis on the sustainable development. Except for the economic principles, the sustainable development includes the ecologic and social orientation. It is a value-based concept working with the values such as fairness, trust and transparency. Therefore, the investment projects could be assessed in terms of being socially responsible and ethical. [20]

## **2 The Methodology for Designing of the Model for the Managerial Decision-making on Investment**

Based on the analysis of the theoretical background within the field of managerial decision-making and within the field of investment decision-making, a general model of the managerial decision-making on investment was designed. This model represented an input for the research focused on the verification of the individual activities of the process of decision-making on investment, identification of the substantial elements, tools and methods used in this process, relationships between them and the impact on the achievement of the right decisions via this process. The object of the quantitative research performed was the decision-making on investment in the medium-sized enterprises operating in the area of the Slovak Republic. The size of the enterprises was selected in relation to their relative independence in the decision-making on investment and the presence of the management (executive officers) in these enterprises separated from the enterprises' owners to a certain degree.

The data garnering was conducted via the inquiry using a questionnaire and also via the semi-structured interviews in the selected enterprises in 2016. The questionnaires and the interviews were composed of 7 parts that were focused on the characteristics of the enterprises, the beginning of the process of the managerial decision-making on investment (the triggers of the process), the ways of identification of the investment variants, the appraisal criteria, the factors influencing the process, methods of the appraisal of the economic efficiency of the investment and the evaluation of the risk. There were 147 enterprises participating in this survey. The interviews were conducted in 10 of them. The questionnaires were addressed mainly to the decision-makers, thus primarily to the managers, owners or the company economists.

To identify the differences in the process of the decision-making on investment among the enterprises, these were divided into the so-called “successful” and “unsuccessful” ones. To create this division, there were specific questions in the

questionnaire pertaining to the assessment of the economic situation of the enterprises based on the revenues, profit and the return on equity as an indicator comparing the profit of the enterprises with the capital invested. The enterprises also had to realise investment projects during the previous 5 years. Therefore, the dividing of enterprises into the successful and unsuccessful ones was also influenced by the satisfaction of the managers or owners with the realisation of these investment projects during the previous 5 years. Based on these criteria, 71 enterprises were identified as the successful ones and 39 enterprises as the unsuccessful ones. The comparison was performed within the individual activities of the researched process, as well as the appraisal criteria of the successful and unsuccessful enterprises, the methods used for the appraisal of economic efficiency, and the attitude of the enterprises towards the risk.

### **3 Research Results on Investment Decision-making**

Based on the conducted research, the following findings were identified that serve as the basic inputs for the design of the model for the managerial decision-making on investment in the medium-sized enterprises:

- up to 64% of the unsuccessful enterprises do not have the strategy defined at all, or they do not have it defined in a particular document, whereas on the other hand, 59% of the successful enterprises have the strategy clearly defined in the form of a specific document. The personal interviews also revealed that the enterprises that have the strategy defined, follow it when making decisions on investment.
- in relation to the determination of the reasons for the beginning of the process of decision-making on investment, it was revealed that a huge part of the unsuccessful enterprises selected the necessity of renewal of the fixed assets (51%) and the identification of shortages within the enterprise (46%) as the most frequent reasons. The successful enterprises consider the seizing of the opportunity in the market (34%) to be the most frequent reason.
- in the current form of the decision-making on investment process, especially the owners of the enterprises are involved, together with the managers. The owners are involved in the process in up to 73% of the successful enterprises and the managers are involved in the process in 67% of the successful enterprises. In the unsuccessful enterprises, the owners are involved in the process in up to 79% and the managers are involved only in 46% of these enterprises. It was also found out that in the unsuccessful enterprises, the most frequent position involved in the process is the owner himself, whereas in the successful enterprises it is the owner accompanied by the manager.
- when determining the possibilities for the investment, the successful enterprises mainly base this on the solutions of their competitors (62%) and on the intuitive ideas generated via the brainstorming (62%). The most frequently used way of unsuccessful enterprises is the analysis of the competitors' solutions (46%), too. However, in contrast with the successful enterprises, only 23% of the unsuccessful ones use the brainstorming. Another finding is that the enterprises use the term

“brainstorming”, but they do not respect all its principles. Therefore, we can rather talk about creative meetings.

- when assessing the investment variants, the successful as well as the unsuccessful enterprises, focus primarily on the amount of the investment (the amount of funds needed) and its payback period. Significant differences within the comparison of the successful and unsuccessful enterprises were identified for the criteria such as the impacts of the investment on the employees, enterprise’s reputation, corporate social responsibility and the previous experience. These criteria are much more important for the successful enterprises than for the unsuccessful ones. On the contrary, the risk of the investment and the difficulty of gathering the funds needed for the investment were much more important for the unsuccessful enterprises. It was also revealed that the successful enterprises can accept an investment which does not have a very favourable amount (the funds needed) and the payback period, but its realization has a significant positive impact on the enterprise.
- during the definition of the impact of factors on the process of the decision-making on investment in the enterprises, it was revealed that the unsuccessful enterprises put much less emphasis on the internal and external factors than the successful enterprises. Considerable differences were identified mainly within the factors such as new technology, the level of information available, market’s development, customers, corporate climate and the owners’ requirements. The acceptance and recognition of the impact of these factors can significantly influence the success the enterprises can achieve.
- the successful, as well as the unsuccessful enterprises, use mainly the static methods such as the indicators of return and the investment’s payback period during the appraisal of the investment’s economic efficiency. The dynamic methods of the appraisal are being used less often in the enterprises. However, when comparing the successful and the unsuccessful enterprises, a considerable difference was identified in the use of the Net Present Value and the Profitability Index. These methods were used by the successful enterprises much more often than by the unsuccessful ones. Based on the personal interviews, it was also revealed that the enterprises do not often use the dynamic methods because they consider them to be difficult and the static methods are sufficient for them.
- in the process of decision-making, the risk needs to be analysed as well. The decision on the investment and the realization of the investment itself represent a relatively high level of risk. The researched enterprises prefer the verbal characteristics when defining the risk (79% of the successful and 42% of the unsuccessful enterprises) and the numeric characteristics (54% of the successful and 41% of the unsuccessful enterprises). Then, to perform the risk analysis the enterprises mainly use the scenarios that are linked with the verbal characteristics mentioned earlier. This technique is used by 45% of successful and 28% of unsuccessful enterprises. The successful enterprises often use sensitivity analysis (40% of these enterprises) too. An interesting finding is that up to 46% of the unsuccessful enterprises do not analyse the risk. This means that they only define the level of the risk verbally. For a comparison, this is the case of only 18% of the successful enterprises.

#### **4 The Model of Managerial Decision-making on Investment in Medium-sized Enterprises**

Based on the conclusions from the research, the model for the managerial decision-making on investment in medium-sized enterprises (see Fig. 2) was designed. The design of this model takes into account the basic elements related to the decision-making process, such as the goal of the decision-making, the criteria of appraisal, the subject and object, variants for the decision-making and their consequences, and the risk situations. The model of the managerial decision-making on investment specifies the phases and activities of the process of the managerial decision-making on investment, starting with the identification of the problem as the trigger of the whole process, and ending with the decision itself and its subsequent implementation. The whole process is divided into three phases: the analytical one, the designing one, and the appraisal one.

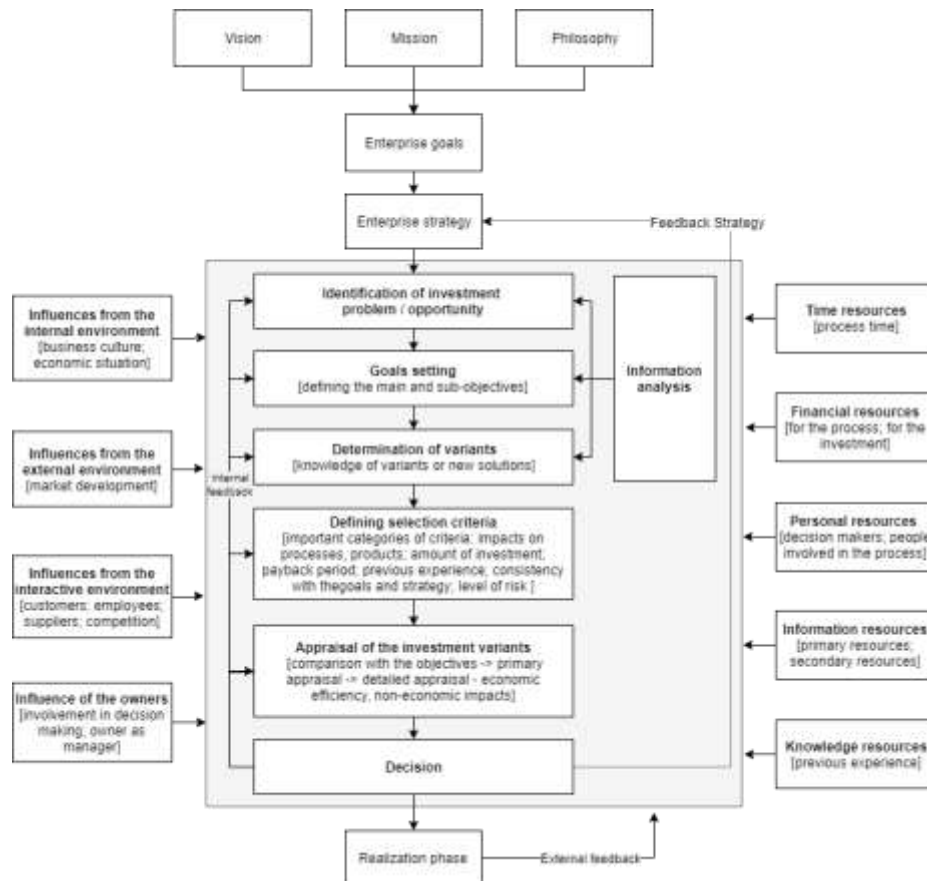
The first phase is the analytical one, encompassing the trigger of the process of the managerial decision-making on investment. This trigger is represented by the identification of the problem or by the identification of an investment opportunity in the market. This activity should follow the business strategy and it should be in harmony with it. The strategy is directly related to the achievement of the strategic goals of the enterprise. These goals follow the enterprise's vision, philosophy and mission. In the research, it was revealed that the successful enterprises that have the strategy defined and captured in the form of a particular document strive for obeying it, thus they make such investment decisions that are related to the fulfilment of the strategic goals. This phase is a prerequisite for the performing of the managerial decision-making on investment itself.

Another activity following the problem identified within the process is the definition of the process's objective. This represents a state that shall be achieved via the solution of the problem identified. When determining the investment objectives, it is necessary to separate main objectives and supportive, which serve to achieve them.

The purpose of the next phase (the designing one) is the identification of the ways of solving the problem determined, serving for the achievement of the objective defined. In this phase, the investment variants are being identified. The quality of the investment decision depends on the determined possibilities of the solutions to the decision-making problem. Therefore, it is necessary to pay attention to the identification of appropriate variants. This activity starts with the recognition of the variants of the solution to the problem by the team of people solving it. If the team of people solving the problem do not know the variants of the solution beforehand, we can talk about a specific problem that will require the designing of new variants of solutions via the methods applicable for the determination of variants. If the team of people solving the problem know the variants of the solution to the problem, it is necessary to focus on the analysis of the information pertaining to the new solutions, and to find out whether it is possible to design new ways of the solution. It is probable, that the situation in the external environment or inside the enterprise has changed. Or, the people solving the problem could gain additional pieces of information. The reason is that the phase of analysis and information gathering are being performed simultaneously. Then, based



on the additional pieces of information, it is still possible to identify other variants of the solution, and the appraisal follows only after that.



**Fig. 2.** The process of managerial decision-making on investment.

If it is necessary to determine the variants in relation to the existence of other possible ways of solving the problem, the enterprises should use the methods serving for their identification. The research showed that the enterprises often use a certain way of application of intuitive methods similar to brainstorming during the solving of the investment problems. However, the term brainstorming cannot be fully applied here since the enterprises do not respect the substantial elements of this method. A recommendation for the enterprises in relation to the brainstorming is to focus on the correct application of this method or to try other methods, such as the Gordon's method.

After the identification of the investment variants it is possible to start with the appraisal phase. The first activity in this phase is the definition of the selection criteria. This activity serves for the determination of the appraisal criteria, weights of these

criteria, ways of the measurement, and other important elements of the appraisal using which it will be possible to appraise the individual investment variants and to compare them. Based on the research, it was revealed that the successful enterprises prefer the non-financial criteria during the investment appraisal to a greater extent than the unsuccessful enterprises. An exception is represented by the amount of investment which is considered important by both groups of enterprises. With regard to the results of the research, in cooperation with 3 managers of enterprises the list of criteria groups for the appraisal of the investment variants was created. Here, the most important criteria are the impacts on the processes and products of the enterprise, the amount of investment and the payback period, the previous experience, consistency with the goals and strategy, and the level of risk.

The second activity is the appraisal of the investment variants. For the appraisal, the process consisting of the following steps was designed: examination of variants in relation to the defined objective of the process, primary appraisal of variants focused on the economic efficiency using the traditional methods of the appraisal, which serves for the identification of the absolutely inefficient variants. Then, the investment variants are being appraised more thoroughly from the perspective of the economic efficiency of investment via the dynamic methods of the appraisal and from the perspective of the non-economic impacts via the multicriterial assessment.

The last activity in the process is the decision itself, which means the selection of the investment variant that achieved the best results in the appraisal of the determined criteria. The selected investment project then enters the process of its implementation.

In the model, also the resources needed for the managerial decision-making on investment are depicted, either those from the external or from the internal environment. These can significantly influence the process of the managerial decision-making on investment in the enterprises. The model includes also three types of feedback. The first one is the internal feedback that provides the check within the process of the managerial decision-making on investment between the individual activities. Then the feedback coming from the last activity of the process is defined. Here, the best investment variant is selected, so its concordance with the enterprise's strategy shall be checked. The last feedback relates to the realisation phase. The information gained here can be compared with planned state and with the presumptions used within the process of the managerial decision-making on investment.

The final form of the model for managerial decision-making on investment was verified at first via the comparison with the theoretical models of managerial and investment decision-making created by various authors. It was necessary to check whether the created model includes all the important elements of the managerial decision-making process and the substantial elements of the investment process. The model was supplemented with the tools, techniques and methods characteristic for the process of the managerial decision-making on investment that shall contribute to a better result of the decision-making process and to a faster and less costly implementation of the process.

Subsequently, the model was tested for its applicability in the business practice based on the interviews with the managers of enterprises that participated in the research. The verification here lied in the comparison of the current procedure for the implementation of the decision-making on investment process in the successful enterprises and the

designed model for the managerial decision-making on investment. The biggest problem perceived by the managers was the application of the dynamic method for the investment appraisal since they had been using it scarcely in the past or they had not been using it at all. In the majority of cases, the indicators of profitability sufficed for them. Also, the managers consider the dynamic methods of the appraisal as relatively difficult. Therefore, we designed a certain way of the calculation of the net present value for the enterprises using the MS Excel. Here, the managers can easily try this method and compare the value of the investment variants even with a certain change of the risk, using the sensitivity analysis.

## **5 Discussion**

The whole process of the managerial decision-making on investment could be viewed as a suitable object for the principles of the project management. However, this requires the existence of a competent project team. In relation to this, Lefley [11] researched the conflict in teams performing the appraisal of the capital investment in large UK enterprises. Professional collaboration of people from various departments can enhance the decision-making process. The author calls this the “departmental conflict”. If this is approached the right way, it improves the performance of the team of the decision-makers solving an investment problem. The application of this approach in the medium-sized enterprises that were studied in our research would be complicated, because these enterprises do not have that kind of differentiated professionals available to create a whole team of decision-makers.

Other researchers focus on applicable methods that could improve the process of decision-making on investment. Here belong, e.g., the research of Shvetsova et al. [18], Costantino et al. [3], and Fotr et al. [7]. Shvetsova et al. recommend using multi-criteria decision-making methods and combine them with interval preferences for the process pertaining to the investment [18]. However, the application of this approach requires rather complicated calculations. Costantino et al. [3] uses the perspective of the project critical success factors used as the criteria in the decision-making process. This includes the strategic objective, experience of managers, and the indicators describing the competition in the market. The author suggests the application of a decision support system in the form of an artificial neural network that would work with the defined criteria. Fotr et al. [7] deals with a particular risk mitigation approach known as the scenario approach. The team of authors describe the steps of this approach and consider it a suitable tool for the management of the risk associated with the investment, and even for the improvement of the strategic planning itself. The problem with more sophisticated and more intricate approaches for the decision-making process is their applicability for the conditions and limitations of the medium-sized enterprises. These do not have all the required resources – whether it’s the technology and software for the calculations and predictions, or the personnel with this kind of skills and knowledge, thus the human capital.

Finally, researchers also deal with specific types of investment. Kauffman et al. focus on the investment in information technology [9]. The authors point out various specifics of this type of investment, such as the changes they elicit in the performance

or the market conditions in the future. Therefore, they state that the traditional methods or the previous experience of the decision-makers do not suffice here. Smyth and Lecoivre researched the specifics of marketing investment [19]. These authors revealed that the short-term criteria related to the financial (economic) part of the issue were not aligned with the long-term orientation. The specifics of particular types of investment surely influence the whole process of the decision-making on investment, but enterprises (and especially the medium-sized ones) firstly need to pay attention to the process of the managerial decision-making on investment as a whole. They need solid and practical foundations they can later adjust for the specific needs of a particular situation. And this was the purpose of our research presented in this paper.

The whole research was conducted within the conditions of the Slovak Republic, therefore the designed model of the managerial decision making on investment is applicable in the environment of the Slovak enterprises. The researched enterprises had the commercial nature and the application of the model for the state administration would not necessarily bring the expected benefits regarding the specific characteristics here. Since all the research activities were focused on the medium-sized enterprises, the general model for managerial decision-making on investment can be applied only in this type of enterprises. Large enterprises have thorough and complex procedures related to the investment decision-making and the process of managerial decision-making is often performed outside the Slovak Republic in the parent companies. On the other hand, small enterprises are being managed mainly by their owners, so they are the performers of the whole process. The owners do not feel the need to define the procedure of activities within the process of decision-making on investment and they act upon their own experience, opinions and attitudes. Therefore, the medium-sized enterprises represent a suitable environment for the application of the designed model for managerial decision-making on investment.

## **6 Conclusion**

The aim of this paper was to present the results of the research focused on the managerial decision making on investment. Based on the main findings gained from the literature review and quantitative data gathered via a questionnaire survey, we designed a model describing the process of managerial decision-making on investment. Subsequently, we tested its applicability in the operation of enterprises via interviews with managers participating in the research. The model we designed will help the managers or the owners of enterprises to build solid foundations for the support of the process of decision-making on various investment projects that affect their success, performance and the position among the competitors.

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# Development of Socio-economic Condition of the Population and the Real Estate Market – Research in the Czech Republic

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**Abstract.** The paper deals with the development of socio-economic condition of the population and the real estate market in the Czech Republic. It explores the influence of annual net household income (in CZK), reflecting the socio-economic situation of the population. Provided the housing market is stabilized, household income becomes the factor affecting real estate market variables such as a predictive value of residential buildings and the number of finished and started apartments, examined in this study. Both variables and relationships between them are assessed using standard statistical tools, namely the average growth coefficient and the annual growth rate. The aim of the study is to verify the methodology of the measurement of the real estate market financial stability and to find out whether the real estate market development depends on the net income of the population. If so, common assumptions about the housing market stability are confirmed. Authoritative sources listed in the literature review section prove the importance of research on this issue. In terms of the data analysed, the following results were achieved. The real estate market in the Czech Republic shows long-term stability. In the short run, however, residential dwellings are in short supply, the rate of housing construction being lower than demand which rises with the improving socio-economic situation of the population. This will nevertheless not necessarily lead to financial instability in the future.

**Keywords:** Real estate market. Socio-economic situation. Czech Republic.

## 1 Introduction

The current domestic debate on the real estate market goes beyond the context of the Czech Republic. In a more general sense, it includes the financial stability of this market segment, raising a problem of whether the so-called real estate bubble is about to, or may potentially arise. This phenomenon can be described as the real estate market “overheating” which results in financial instability and the so-called real estate bubble burst. There is a plunge in real estate prices due to previous purchases of properties at prices that exceeded the financial potential of households, the net income being the indicator of their economic standing. The present research is based on the assumption that a household buys the property to meet its housing needs, not taking into account

potentially speculative or investment intention of the buyer. The study focuses on apartment construction, which primarily serves for housing since the majority of residential buildings are purchased by end-users – households using mortgage loans, their own savings or the combination of both. The net household income is the basis of the real estate market, determining the amount of the loan (banks approve it based on the applicant's net income) and generating savings to fund housing, the latter also, alternatively, as a financial contribution along with a mortgage loan. Thus, it can be assumed that the health of the real estate market as well as real property prices should correspond to net disposable income of households. The development of the real estate market attributes (factors such as an approximate value of residential buildings and completed and started apartments) is supposed to unfold in a desirable way – the mean coefficient of growth of the above variables being the same or lower than that of net household income, signalling that housing market trends are in line with those of household net disposable income, and thus proportionally corresponding to the socio-economic conditions of the population. Then, we might conclude that the real estate market would not “heat up”. It would mean that a high growth rate of property and housing prices does not necessary lead to a real estate bubble, providing this growth rate is in line with living standards of the population. Likewise, the annual growth rate of the housing market should correspond to that of household net income.

The purpose of this study is to explore the key attributes of the real estate market (residential housing), verifying their dependence on the socio-economic condition of the population measured by the net disposable income of households in the Czech Republic.

## **2 Literature review**

The importance of ongoing research in the financial stability of the real estate market is highlighted by [8] and [11] who note that “In recent years, real estate bubbles have been commonplace in housing markets all over the world”. The same situation could be expected in China [13] who note that “We review recent major crises around the world from 1980 to 2014. We then discuss the ways real estate crises develop into financial crises (considering that most recent financial crises actually trace their origins to real estate bubbles)” Generally, the emergence of a real estate bubble is associated with the 2008 crisis triggered by subprime mortgage debts in the U.S. “The global economic crisis of 2008 has demonstrated the severity of financial shock that can be caused by inconsiderate investments in the real estate market [6]”. There are obvious real estate market cycles, [11] describing their four – recession, recovery, expansion and oversupply – phases. The Czech mortgage market is, however, specific. Not being burdened by the above-mentioned U.S. lending practices, it does not indicate a “severe” recession characteristic. Recently, nevertheless, growing fears of real estate bubble and market meltdown have appeared even in the Czech Republic due to rising property prices. The reason for it could be caused by following reason “Owning a house has become one of the main objectives in people's life. Given the high prices of the houses, the majority of the families apply for a loan. The real estate market has become a very

important mechanism in the England economic infrastructure [11]”. The same is confirmed by [1] “Owning a house is a key factor in the social wellbeing of the English people. Even if for the majority of the families a house is not affordable, the banking system and the government are trying to reduce the burden.” It seems clear from the above that customers who are interested in purchasing a real estate property tend to accept such a price that might be too high, their income not allowing for mortgage repayment. (Let us note that the banking system of the Czech Republic checks the creditworthiness of mortgage applicants, excluding those who are not able to secure and repay the loan.)

Ignoring the above controversial and difficult-to-quantify aspect, we can focus on crucial real estate factors such as market capacity, which is examined in terms of started and completed dwellings in the following sections of the paper. On the real estate market capacity, [1] argue that “It is tempting to think of market capacity simply in volume terms, in the sense of a finite number of new homes that can be absorbed annually in each housing market area. While most debate about market capacity at planning inquiries takes place at this level, it ignores the crucial impact of price on capacity. Since speculative house-builders operate simultaneously in the housing and land markets, the way in which housing prices and land prices interrelate is central to unpacking the concept market capacity”.

Other key real estate market factors are to be taken into account as well. As [3] point out, “at the local government level, there is a need to use reliable methods for the identification of similar real estate, which arises from many practical issues, especially from land management and land administration, e.g.:

- municipal development strategy planning or zoning plans
- decision-making by local authorities in the field of housing policy
- assessment of the condition of local real estate markets in the region
- strategic management of territorial entities
- forecasting the development of various areas [and]
- developing analyses and better decision-making by analysts, developers and investors”.

The above references suggest that the situation on the real estate market is to be assessed through the prism of specific conditions of different countries. The issue of the Czech mortgage market is addressed by [9], who study the reasons for buying a property. Their findings imply that most buyers do not purchase a real estate property to do business, i.e. to make money from the asset. We can thus conclude that the key determinant of residential housing demand is the buyer’s actual need for housing. This is also supported by the conditions of apartment ownership, the residents of Central and Eastern Europe, contrary to those of western countries, preferring privately owned housing to rental contracts see [10].



### 3 Methodology and Goals

The aim of the study is to verify the methodology of the measurement of the real estate market financial stability and to find out whether the real estate market development depends on the net income of the population. If so, common assumptions about the housing market stability are confirmed.

Statistical analysis tools, namely the average growth coefficient and annual growth rate, have been applied in the present study.

#### 3.1 Average Growth Coefficient

The average growth coefficient indicates the dynamics of time series. [2] note that “if this coefficient is multiplied by 100, it indicates to how many percent of the time t-1 value has the time t value increased. Sometimes the term *growth rate* is used instead of coefficient of growth. *Average growth coefficient* (mean growth rate) is calculated as the geometric mean of individual growth coefficients.” A standard calculation is done as follows:

$$\bar{k} = \sqrt[r-1]{\frac{y_2}{y_1} * \frac{y_3}{y_2} * \dots * \frac{y_r}{y_{r-1}}} = \sqrt[r-1]{\frac{y_r}{y_1}}, \quad (1)$$

Source: [2]

Where:

$y$  = the variable analysed in a given year

$r$  = the number of growth coefficients

#### 3.2 Annual Growth Rate

The annual growth rate can be expressed in percentage or absolute terms, indicating a percentage or absolute change in the variable compared to the previous year. A general fraction to calculate the growth rate is

$$\frac{(y_t - y_{t-1})}{y_{t-1}}, \quad (2)$$

Source: [2]

its absolute increase being written as:

$$y_t - y_{t-1}, \quad (3)$$

Source: [2]

Where:

$y_t$  = the variable in a given year

$y_{t-1}$  = the variable in the previous year

## 4 Results

In the next chapter will be solved net household income (average growth coefficient), residential building value (average growth coefficient), annual growth rate of net household income and residential building value, completed apartments (average growth coefficient), annual growth rate of net household income and completed apartments, started apartments (average growth coefficient) and annual growth rate of net household income and started apartments.

### 4.1 Data Sources

The research was carried out using 2005–2016 data obtained from [5] and [7], 2017 data not being available at the time of conducting the research. Summarized below are the results of the variables analysed over the period between 2005 and 2016.

**Table 1.** Net household income (in CZK) – average growth coefficient (2005–2016) [5].

Year	Net cash income	Absolute increase	Growth rate	Growth coefficient
2005	108,676	N/A	N/A	N/A
2006	116,549	7,873	7.244 %	1.072
2007	125,817	9,268	7.952 %	1.080
2008	137,497	11,680	9.283 %	1.093
2009	142,402	4,905	3.567 %	1.036
2010	145,437	3,035	2.131 %	1.021
2011	145,081	-356	-0.245 %	0.998
2012	152,125	7,044	4.855 %	1.049
2013	150,488	-1,637	-1.076 %	0.989
2014	153,269	2,781	1.848 %	1.018
2015	157,623	4,354	2.841 %	1.028
2016	164,852	7,229	4.586%	1.046

Tab. 1. presents net household income in CZK and average growth coefficient. The highest growth rate was recorded in 2008 with 9.283% increase. The decline to minus was recorded in 2011 and 2013. The average coefficient of net income growth is 1.039.

Tab. 2 presents residential building value, absolute increase, growth rate and growth coefficient. There were big changes in 12 monitored years. The approximate value of residential buildings has an average growth coefficient of 0.989.

**Table 2.** Residential building value – average growth coefficient (2005–2016) [5].

Year	Residential building value (approx., in CZKm)	Absolute increase	Growth rate	Growth coefficient
2005	97,259	N/A	N/A	N/A
2006	111,444	14,185	14.585 %	1.146
2007	116,032	4,588	4.117 %	1.041
2008	121,822	5,790	4.990%	1.050
2009	112,000	-9,822	-8.063%	0.919
2010	95,473	-16,527	- 14.756%	0.852
2011	97,222	1,749	1.832 %	1.018
2012	81,462	-15,760	-16.210 %	0.838
2013	72,348	-9,114	-11.188%	0.888
2014	76,704	4,356	6.021 %	1.060
2015	81,568	4,864	6.341 %	1.063
2016	85,951	4,383	5.373 %	1.054

Tab. 3 compare growth rate of net cash income with growth rate of residential building value. Five times were not recorded growth rate of net cash income in the connection to growth rate of residential building value.

**Table 3.** Annual growth rate of net household income and residential building value [5].

Year	Growth rate of net cash income	Growth rate of residential building value	Growth rate of net cash income $\geq$ growth rate of residential building value
2005	N/A	N/A	N/A
2006	7.244 %	14.585 %	NO
2007	7.952 %	4.117 %	YES
2008	9.283 %	4.990%	YES
2009	3.567 %	-8.063%	YES
2010	2.131 %	- 14.756%	YES
2011	-0.245 %	1.832 %	NO
2012	4.855 %	-16.210 %	YES
2013	-1.076 %	-11.188%	YES
2014	1.848 %	6.021 %	NO
2015	2.841 %	6.341 %	NO
2016	4.586%	5.373 %	NO

The average growth coefficient of household net disposable income is higher than the growth rate of the number of dwellings (the value for the builder), the former amounting to 1.039, the latter reaching 0.989. Thus, in terms of the value of residential buildings examined in the given period, the real estate market has proven stable.

Tab. 4 presents completed apartments, absolute increase/decrease, growth rate and growth coefficient. The biggest growth rate was recorded in 2007 and the biggest decline in 2011. The average coefficient of growth of completed apartments is 0.983.

**Table 4.** Completed apartments – average growth coefficient (2005–2016) [7].

Year	Completed apartments	Absolute increase	Growth rate	Growth coefficient
2005	32,863	N/A	N/A	N/A
2006	30,190	-2,673	-8.134%	0.919
2007	41,649	11,459	37.956 %	1.380
2008	38,380	-3,269	-7.849%	0.922
2009	38,473	93	0.242 %	1.002
2010	36,442	-2,031	-5.279 %	0.947
2011	28,630	-7,812	-21.437 %	0.786
2012	29,467	837	2.924%	1.029
2013	25,238	-4,229	-14.352%	0.856
2014	23,954	-1,284	-5.088%	0.949
2015	25,095	1,141	4.763%	1.048
2016	27,333	2,238	8.918 %	1.089

Tab. 5 presents comparison of annual growth rate of net household income and completed apartments. Only in three monitored years was not growth rate of net cash income bigger than growth rate of completed apartments.

**Table 5.** Annual growth rate of net household income and completed apartments [5, 7].

Year	Growth rate of net cash income	Growth rate of completed apartments	Growth rate of net cash income $\geq$ growth rate of completed apartments
2005	N/A	N/A	N/A
2006	7.244 %	-8.134%	YES
2007	7.952 %	37.956 %	NO
2008	9.283 %	-7.849%	YES
2009	3.567 %	0.242 %	YES
2010	2.131 %	-5.279 %	YES
2011	-0.245 %	-21.437 %	YES
2012	4.855 %	2.924%	YES
2013	-1.076 %	-14.352%	YES
2014	1.848 %	-5.088%	YES
2015	2.841 %	4.763%	NO
2016	4.586%	8.918 %	NO

The average growth coefficient of household net monetary income (1.039) also exceeds that of the number of finished apartments, the latter being 0.983. It can therefore be

concluded that, regarding a long-term trend of completed dwellings traced in the study, the real estate market has been stabilized.

Tab. 6 presents started apartments, absolute increase, growth rate and growth coefficient. The biggest decline in started apartments according to absolute decrease and growth rate was recorded in 2010. The biggest increase was recorded in 2014 with growth rate 10.146%. Absolute increase was the biggest in 2006 with 3,366 new apartments.

**Table 6.** Started apartments – average growth coefficient (2005–2016) [7].

Year	Started apartments	Absolute increase	Growth rate	Growth coefficient
2005	40,381	N/A	N/A	N/A
2006	43,747	3,366	8.336 %	1.083
2007	43,796	49	0.112%	1.001
2008	43,531	-265	-0.605%	0.994
2009	37,319	-6,212	-14.270%	0.857
2010	28,135	-9,184	-24.609%	0.754
2011	27,535	-600	-2.133%	0.979
2012	23,853	-3682	-13.372 %	0.866
2013	22,108	-1 745	-7.316%	0.927
2014	24,351	2 243	10.146 %	1.101
2015	26,378	2 027	8.324%	1.083
2016	27,224	846	3.207 %	1.032

The average coefficient of growth of started apartments is 0.965.

Tab. 7 presents comparison of growth rate of net income and growth rate of started apartments. In 8 years was growth rate of net income bigger than growth rate of started apartments.

Also, the average growth coefficient of net cash income is higher than that of the number of started apartments which has the value of 0.965. As regards dwellings under construction observed in the long-run perspective, we can again summarize that the real estate market keeps stable.

**Table 7.** Annual growth rate of net household income and started apartments [5, 7].

Year	Growth rate of net income	Growth rate of started apartments	Growth rate of net income $\geq$ growth rate of started apartments
2005	N/A	N/A	N/A
2006	7.244 %	8.336 %	NO
2007	7.952 %	0.112%	YES
2008	9.283 %	-0.605%	YES
2009	3.567 %	-14.270%	YES
2010	2.131 %	-24.609%	YES
2011	-0.245 %	-2.133%	YES
2012	4.855 %	-13.372 %	YES
2013	-1.076 %	-7.316%	YES
2014	1.848 %	10.146 %	NO
2015	2.841 %	8.324%	NO
2016	4.586%	3.207 %	YES

Summarized below are the results of the variables analysed over the period between 2005 and 2016.

**Table 8.** Annual growth rate [5, 7].

The average growth coefficient of household net disposable income	1,039
The average growth coefficient of dwellings (the value for the builder)	0,989
The average growth coefficient of completed apartments	0,983
The average growth coefficient of started apartments	0,965

## 5 Conclusion and Discussion

Analysis of long-term factors (net income growth rate, residential building value, the number of completed and started dwellings) over the 2005–2016 period has shown that the real estate market is stabilized, its development being driven by net disposable income trends.

**Table 9.** Comparison of annual growth rates of individual variables.

Growth rate comparison	Relationship confirmed	Relationship confirmed	not
Growth rate of net income $\geq$ growth rate of residential building value	54.54 %	45.45 %	
Growth rate of net income $\geq$ growth rate of completed apartments	72.72 %	27.27 %	
Growth rate of net income $\geq$ growth rate of started apartments	72.72 %	27.27 %	

In terms of the annual growth rate of particular variables, we can conclude that the increase in net cash income is in most cases greater than that of completed and started apartments. This, however, is reflected in the growth rate of the value of residential buildings (see above). Short-term (year-on-year) analysis indicates the possibility of overheating the market, demand for dwellings outstripping supply (of finished and started ones) due to an increase in net household income. Such a development does not necessarily lead to a real estate bubble signalling market instability. This is not the case if the amount of loans (the value of residential buildings) corresponds to net income value, i.e. banks provide mortgage credits based on clients' current and future earnings. Housing supply meeting demand in the long-run is another prerequisite to be fulfilled. Since average growth rate values in the Czech Republic throughout the period 2005–2016 are in line with the above conditions, the country enjoys a stable real estate market. In spite of the fact given below, it is necessary to control the situation with the procedure given by [12].

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# The Iterative Method of Development Pattern and Anti-Pattern

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**Abstract.** The ordering or ranking of multidimensional objects is a very popular subject of research. The first formal method was proposed by Hellwig [4]. He introduced the division of variables into stimulants (the bigger the better) and destimulants (the smaller the better). His main idea was to find the artificial object, called “development pattern” defined by the best values of variables. Then distances for all objects from the development pattern are calculated and objects are ranked according to the diminishing value of this distance. The next idea was to define the “development anti-pattern” – the artificial object defined by the worst values. Objects are ranked according to the growing distance from the anti-pattern. In the presence of outliers, at least in one variable, can have big influence on the final ranking. Such outliers introduce unexpected weighting system to the problem. If there is an object with one value very much bigger than the rest of the set, values of this variable – through standardization – are moved toward the other end of the distribution which becomes skewed. In order to avoid this problem we propose to use an iterative procedure. Objects are ranked one by one. We assigned just one rank to the best object on a given iteration of the procedure, and then this object is eliminated from the lot. The formula to calculate the composite index is given. The example deals with the measurement of innovation activity of provinces in Poland.

**Keywords:** Linear Ordering, Development Pattern, Multivariate Analysis.

## 1 Introduction

Linear ordering of objects based on composite indicator calculated from individual variables is used in different fields such as economy, quality of life, environment, development etc. The first method of linear ordering was proposed by Hellwig [4] in 1968. Generally not so many different approaches have been proposed in the literature since then. Saisana and Tarantola [11] list just six methods and they also give a review of some applications. TOPSIS approach (Hwang and Yoon [5]) and its fuzzy variants (Chen and Hwang [2]) can be added to this list. The crucial points in all procedures are as follows: selection of sub-indicators, normalization (or standardization) method, weighting system and aggregation formula. Uncertainty and sensitivity of choices with these steps has been studied by Saisana, Saltelli and Tarantola [10]. The most well-

known composite index is a Human Development Index for world countries, proposed by Amartya Sen and Mahbub ul Haq, calculated and published since 1990 (See Sen [12], Sager and Najam [9], Stanton [13])

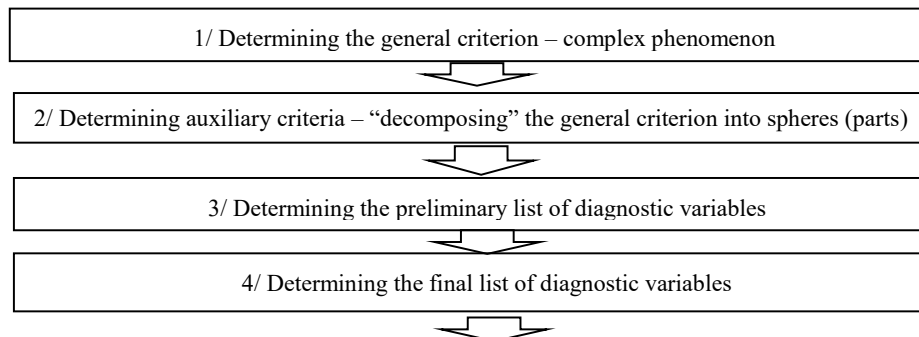
Markowska and Sokołowski [6] proposed an iterative method of multidimensional objects ordering using the most popular ordering method (OECD [8]), referred to in this paper as the classical one. The characteristics are made comparable by normalizing the distance from the worst object (the lowest value for stimulants and the highest for destimulants) by the range, for each characteristic separately. This operation brings down the values of all characteristics to the range [0;1] and changes destimulants into stimulants.

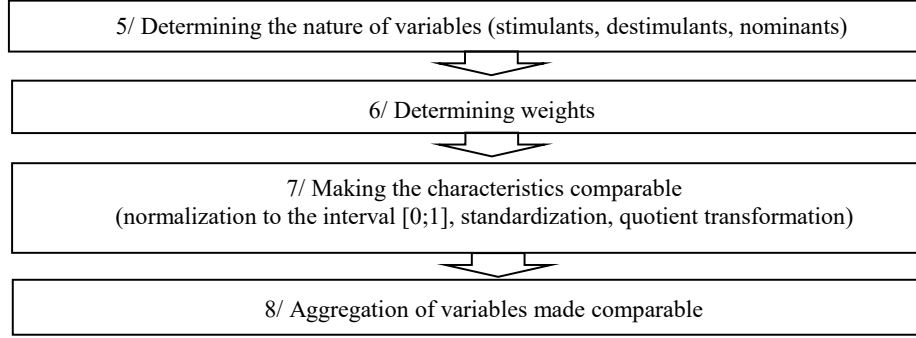
The aggregate index is calculated as an arithmetic mean, or a weighted arithmetic mean, if a reasonable weighting system can be proposed (e.g. expert weights). If the distributions of characteristics are very asymmetrical, or if outliers are present, an additional weighing factor is brought into the procedure. The importance of the negative asymmetric distribution is strengthened for the majority of characteristics, whereas those with strong positive asymmetric distribution – are weakened. The presented paper proposes defining the hierarchy of objects starting from the best one. Once assigned the subsequent rank, the object is removed from the working set, and thus the minimum or maximum reference points can be changed.

The goal of this study is to propose the application of an analogical iteration procedure to Hellwig's development pattern/anti-pattern method [4], and also to discuss the question regarding the extent to which the iterative procedure gives different results comparing to the original (non-iterative) Hellwig's approach. The empirical example provided has mainly an illustrative purpose, and not the comprehensive analysis of the problem considered.

## 2 Method

In the original development pattern method, firstly the characteristics are made comparable using standardization. Next the distances of objects to the development pattern defined by maximum stimulant values and minimum destimulant values, are calculated. The objects are ranked in a sequence from an object closest to the pattern to the one most distant from the pattern. The procedure of aggregate index calculation, in accordance with the classical ordering method, is presented in Fig. 1.





**Fig. 1.** Aggregate index determining procedure.

At the stage of step no. 7 the characteristics are usually unified, i.e. transformed into stimulants. The following formulas are applied in the classical method:

$$x_i^* = \frac{x_i - \min\{x_i\}}{\max\{x_i\} - \min\{x_i\}}, \quad \text{for stimulants, (1)}$$

$$x_i^* = \frac{\max\{x_i\} - x_i}{\max\{x_i\} - \min\{x_i\}}, \quad \text{for destimulants. (2)}$$

The next stage consists in the aggregation of variables made comparable – usually by using an additive formula taking the form of weighted arithmetic mean:

$$W_i = \frac{s}{\sum_{j=1}^m a_j} \sum_{j=1}^m a_j x_{ij}^*, \quad (3)$$

where:

$i$  – object's number,

$W_i$  – value of aggregate index for  $i$ -th object,

$j$  – characteristic's number,

$m$  – number of characteristics,

$a_j$  – weight of  $j$ -th characteristics,

$x_{ij}$  – value of  $X_j$  variable observed on  $i$ -th object (made comparable),

$s$  – scale factor (usually adopted as 1 or 100).

As a result, aggregate index values are calculated and can be ranked. Our proposal ranks objects individually, starting from the one “located” as the closest to the pattern. After finding the best object, it is eliminated from the list of the currently considered ones and standardization is carried out again. As a result, both the standardized values of characteristics and the pattern coordinates change. The following ranking positions are

determined gradually, one in each iteration, and later the assigned object is eliminated from the set in which the next consecutive object is searched for. This method can be referred to as the *moving pattern method*. The values of aggregate index are determined according to the procedure presented in Figure 2.

The described algorithm is repeated until three worst objects, assigned to the last ranks, remain in the subset. The procedure requires proposing a new method for determining the aggregate index, in which while determining the *i*-th rank the following is calculated:

$$D_{(i+1)} = \frac{W_{(i+1)}^i}{W_{(i)}^i}, \quad (4)$$

where:

$D_{(i+1)}$  – reduction ratio of aggregate index,

$(i)$  – *i*-th rank,

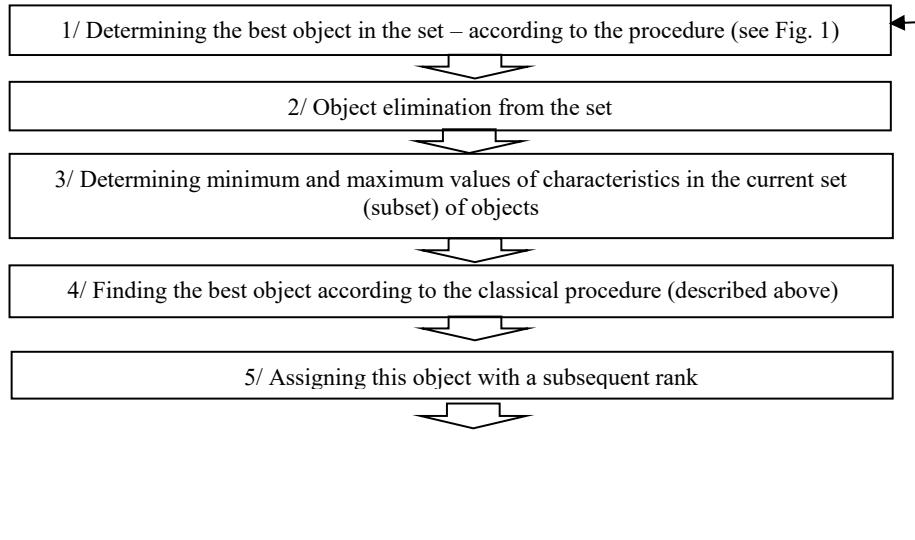
$W_{(i)}^i$  – local aggregate index calculated when determining *i* rank.

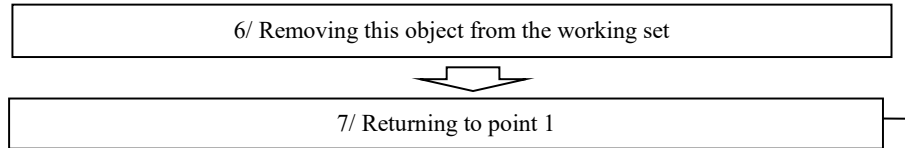
The final value of aggregate index is determined based on formula (5):

$$W_{(k)} = W_{(1)}^1 \prod_{i=2}^k D_{(i)}. \quad (5)$$

The values for subsequent objects are reduced according to the proportion resulting from the last joint comparison of the given and previous object (regarding the rank order).

The *moving anti-pattern method of development* works in a similar way, with the order of objects being determined from the worst object, i.e. the closest to development anti-pattern, determined by the smallest values of characteristics made comparable. Objects are removed from the set starting with *n* ranked object.





**Fig. 2.** Aggregate index determining procedure – *moving pattern method*.

Due to the fact that the purpose of the study is also to answer the question regarding the extent to which the iterative procedure gives different results than the original approach, one comparison is given here – based on statistical data used to develop the Relative Index of Enterprise Innovation Activity (RIEIA) proposed by Markowska and Strahl [7], in the part referring to industrial activity sphere (RIEIA). The index covers 39 characteristics and a dual system of weights using expert weights and a hierarchical structure of characteristics. (Freudenberg [3] constructed an index of innovation performance based on 12 variables within three groups: generation of new knowledge, industry-science linkages / technology diffusion, industrial innovation).

The list of characteristics used in our example and the final values of weights are presented in Table 1.

**Table 1.** Variables used to develop the Relative Index of Industrial Enterprise Innovation Activity.

	Variable	Industry		Weight
		Range	Poland	
I	Enterprises investing in innovations	10.9-16.4	14.0	1.00
I	Average innovation investments per enterprise in 1000's PLN	356-1362	968	1.00
P	Enterprises receiving public financial support	3.6-7.5	4.9	1.00
P	Enterprises receiving public financial support from domestic institutions	1.6-4.9	2.7	0.50
P	Enterprises receiving public financial support from local authorities	0.4-2.1	1.0	0.25
P	Enterprises receiving public financial support from central authorities	1.1-3.0	1.9	0.25
P	Enterprises receiving public financial support from EU	2.5-5.9	3.7	0.50
P	Enterprises receiving public financial support from Horizon 2020	0.0-1.3	0.4	0.25
A	Innovation active enterprises	14.5-23.1	18.9	1.00
A	E.w.i.* innovations	13.7-21.5	17.6	1.00
A	E.w.i. new products	9.6-14.4	11.8	0.50
A	E.w.i. new processes	6.8-13.8	9.9	0.17
A	E.w.i new logistics	1.8-4.7	3.2	0.17
A	E.w.i supporting activities	4.0-7.5	5.9	0.17
A	E.w.i organisational or marketing innovations	8.2-16.3	11.4	1.00
A	E.w.i organisational innovations	5.3-10.5	8.1	0.50
A	E.w.i new business practices for organisational procedures	3.6-8.2	6.1	0.17
A	E.w.i. new methods in work responsibilities	2.8-7.9	5.0	0.17
A	E.w.i. new methods in external relations	1.9-4.7	3.1	0.17
A	E.w.i. marketing innovations	4.7-12.5	7.1	0.50

Variable		Industry		Weight
		Range	Poland	
A	E.w.i. new packaging	2.6-9.0	4.2	0.13
A	E.w.i. new media and promotion	1.7-6.8	3.8	0.13
A	E.w.i. new product placement and sales	1.1-3.7	2.1	0.13
A	E.w.i. new pricing	1.4-5.4	2.7	0.13
C	Enterprises cooperating	3.7-8.4	5.5	1.00
C	Enterprises cooperating for receiving access to intellectual property	0.1-0.3	0.2	0.17
C	Enterprises benefiting from free intellectual property	0.7-2.7	1.4	0.17
C	Enterprises using innovations protected by exclusive rights	1.6-3.7	2.3	0.17
E	Revenues from products to the market	3.6-18.3	9.5	0.50
E	Revenues from products new to the firm	1.1-13.1	5.5	0.50
E	Enterprises with applications for trademarks in Poland	0.4-6.5	3.0	1.00
E	Enterprises with applications for industrial designs in Poland	0.5-5.3	1.3	1.00
E	Enterprises with applications for utility models in Poland	0.2-3.3	1.0	1.00
E	Enterprises with applications for patents in Poland	1.2-4.6	2.3	1.00
E	Enterprises planning to apply for foreign patents	0.1-2.8	0.6	0.50
E	Enterprises with Polish patent applications resulted from internal R&D activities	1.1-3.7	1.6	0.50
E	Enterprises which obtained patents in Poland	1.0-4.9	2.0	1.00
E	Enterprises which made application for foreign patent	0.3-3.4	1.0	1.00
E	Enterprises which obtained foreign patents	0.1-3.0	0.7	1.00

\* – *Enterprises which introduced*. Notes: I – investments, P – public aid, A – innovative activities, C – cooperation, E – effects; unless otherwise specified the values are expressed *as percentage of all industrial enterprises* [7].

### 3 Results

In the study [4] partial indexes were calculated for Polish regions at NUTS 2 level regarding such innovation areas as: investment outlays for innovation, public aid, innovative activity, cooperation in the field of innovation and the effects of innovative activities – for industry and separately for services. The statistical data used come from the short version of CIS (*Community Innovation Survey*) study [1], and are presented as percentages. The indexes were calculated using the classical normalization method to the interval [0;1], by a new iterative method, which defines the positions subsequently one after the other from the best object, and also using a rank (point-based) method. The cited study discusses such methodological problems as: the consequences of abandoning normalization (in the situation, in the case when the characteristics taken into account in the assessment are presented as percentages and represent stimulants), the selection of variable weighing systems (when they are of hierarchical nature and percentages do not add up to 100 due to the multiple choice of variants), aggregating partial indexes into a global one.

Below, along with the results of the original pattern and anti-pattern development methods and their iterative versions, the results of the classical linear ordering method and its iterative version are presented following Markowska and Strahl [7] – Table 2.

**Table 2.** The values of Relative Index of Industrial Enterprise Innovation Activity, calculated for Polish provinces, for 2015.

Province	Pattern method		Anti-pattern method		Classical method	
	original	iterative	original	iterative	original	iterative
Dolnośląskie	<b>25</b>	<b>23</b>	<b>63</b>	<b>66*</b>	<b>54</b>	<b>51</b>
Kujawsko-pomorskie	20	20	<u>45</u>	<u>33</u>	26	25
Lubelskie	15	14	<u>43</u>	<u>32</u>	<b>32</b>	<b>28</b>
Lubuskie	15	16	<u>41</u>	<u>31</u>	<b>26</b>	<b>18</b>
Łódzkie	<b>13</b>	<b>15</b>	<b>34</b>	<b>25</b>	24	24
Małopolskie	<b>32</b>	<b>30</b>	66	67	<b>49</b>	<b>46</b>
Mazowieckie	<b>27</b>	<b>25</b>	<b>56</b>	<b>50</b>	47	46
Opolskie	<b>26</b>	<b>24</b>	<b>69</b>	<b>73*</b>	50	49
Podkarpackie	<b>35</b>	<b>31</b>	<u>79</u>	<u>92*</u>	<b>62</b>	<b>57</b>
Podlaskie	57	57	115	115	64	64
Pomorskie	25	24	<b>54</b>	<b>48</b>	32	31
Śląskie	42	42	<b>75</b>	<b>78*</b>	59	59
Świętokrzyskie	<b>4</b>	<b>10*</b>	<b>25</b>	<b>18</b>	11	10
Warmińsko-mazurskie	17	17	<u>40</u>	<u>30</u>	29	28
Wielkopolskie	<b>27</b>	<b>25</b>	<u>54</u>	<u>44</u>	36	36
Zachodniopomorskie	<b>23</b>	<b>21</b>	<b>54</b>	<b>46</b>	<b>38</b>	<b>40*</b>

The change by two or more is marked in bold, the changes in plus are marked with an asterisks, and the changes by 10 or more are underlined. Source: author's calculations and [7].

When calculating an index value using the original pattern and anti-pattern development method, the selection of reference distance remains the key problem. Hellwig [4] proposed the reference point to be the mean distance plus twice the standard deviation of the distance. The reference point from the original version of the aggregate index does not ensure that the index value is less than 1 (and not higher than 100 in the version adopted for this study). Podlaskie province is close to the pattern, far from the anti-pattern and the index value for this province is relatively small in case of the pattern method, and relatively high in case of the anti-pattern method. The additional factor causing this phenomenon is the effect of “inflating space” – the larger the space, the longer the distances between empirical points. In case of the studied problem the classification space is a 39-dimensional one. Podlaskie province is the best one in industrial innovation activity, so by definition, its composite index has the same value in both, iterative and non-iterative procedures.

The similarity of index values calculated using classical methods against the results of iterative methods was assessed using linear correlation coefficients. They are presented in Table 3.

All of them are statistically significant (correlation coefficients from 0.826 up to 0.989).

**Table 3.** Linear correlation coefficients of innovation indexes.

Specification		Pattern method		Anti-pattern method		Classical method	
		original	iterative	original	iterative	original	iterative
Pattern method	original	1	<b>0.985</b>	0.967	0.931	0.884	0.901
	iterative	<b>0.985</b>	1	0.950	0.910	0.826	0.848
Anti-pattern method	original	0.967	0.950	1	<b>0.981</b>	0.908	0.910
	iterative	0.931	0.910	<b>0.981</b>	1	0.941	0.934
Classical method	original	0.884	0.826	0.908	0.941	1	<b>0.989</b>
	iterative	0.901	0.848	0.910	0.934	<b>0.989</b>	1

Correlation coefficients higher than 0.98 are marked in bold. Source: authors' calculations. While comparing the original versions with the iterative ones it can be observed that, in general, they are similar in case of three methods: pattern, anti-pattern and classical method (values in bold in Table 4). The relatively largest differences in the values of aggregate indexes occur in case of the anti-pattern method, and the results obtained using pattern method differ the most from the method referred to as the classical one. Table 4 lists the ranks of provinces based on the values of indexes from Table 2. The similarity of ordering was assessed using the Spearman's rank correlation coefficient (Table 5).

**Table 4.** Ranks of provinces based on the values of Relative Index of Industrial Enterprise Innovation Activity, calculated for Polish provinces, for 2015 [7].

Province	Pattern method		Anti-pattern method		Classical method	
	original	iterative	original	iterative	original	iterative
Dolnośląskie	<b>8</b>	<b>9</b>	6	6	4	4
Kujawsko-pomorskie	11	11	11	11	13	13
Lubelskie	<b>13</b>	<b>15</b>	12	12	<b>10</b>	<b>11</b>
Lubuskie	<b>14</b>	<b>13</b>	13	13	<b>14</b>	<b>15</b>
Łódzkie	<b>15</b>	<b>14</b>	15	15	<b>15</b>	<b>14</b>
Małopolskie	4	4	5	5	6	6
Mazowieckie	6	6	7	7	7	7
Opolskie	7	7	4	4	5	5
Podkarpackie	3	3	2	2	2	3
Podlaskie	1	1	1	1	1	1
Pomorskie	<b>9</b>	<b>8</b>	8	8	<b>11</b>	<b>10</b>
Śląskie	2	2	3	3	<b>3</b>	<b>2</b>
Świętokrzyskie	16	16	16	16	16	16
Warmińsko-mazurskie	12	12	14	14	12	12
Wielkopolskie	5	5	10	10	9	9
Zachodniopomorskie	10	10	9	9	8	8



**Table 5.** Rank correlation coefficients for provinces by innovation indexes.

Specification		Pattern method		Anti-pattern method		Classical method	
		original	iterative	original	iterative	original	iterative
Pattern method	classical	1	<b>0.988</b>	0.926	0.926	0.906	0.918
	iterative	<b>0.988</b>	1	0.909	0.909	0.859	0.879
Anti-pattern method	classical	0.926	0.909	1	<b>1.000</b>	0.956	0.956
	iterative	0.926	0.909	<b>1.000</b>	1	0.956	0.956
Classical method	classical	0.906	0.859	0.956	0.956	1	<b>0.991</b>
	iterative	0.918	0.879	0.959	0.959	<b>0.991</b>	1

Index values, according to the pattern and anti-pattern method can be combined into one indicator by an arithmetic or geometric mean. In the presented study it was decided to use the geometric mean. The results are presented in Table 6.

**Table 6.** The values of Relative Index of Industrial Enterprise Innovation Activity, calculated for Polish provinces, for 2015, obtained using combined pattern-anti-pattern method, and ranks of provinces.

Province	Index values		Ranks	
	original	iterative	original	iterative
Dolnośląskie	40	39	6	6
Kujawsko-pomorskie	30	25	11	11
Lubelskie	26	21	<b>13</b>	<b>14</b>
Lubuskie	24	22	<b>14</b>	<b>13</b>
Łódzkie	21	19	15	15
Małopolskie	46	45	4	4
Mazowieckie	39	35	7	7
Opolskie	42	42	5	5
Podkarpackie	53	54	3	3
Podlaskie	81	81	1	1
Pomorskie	37	34	<b>9</b>	<b>8</b>
Śląskie	56	57	2	2
Świętokrzyskie	10	14	16	16
Warmińsko-mazurskie	26	23	12	12
Wielkopolskie	38	33	<b>8</b>	<b>9</b>
Zachodniopomorskie	35	31	10	10

To sum up, it should be stated that, as in other applications of an iterative procedure, the ranking changes are quite small, but for local authorities even those small changes could be considered important, especially when the country consist of not so many administrative units of NUTS 2 level.

## 4 Conclusions

The example covering a relatively small number of objects was selected to illustrate the problem in order to allow the Reader, track changes in their ordering for each method.

In case of enterprises' innovation assessment against the classical version, the ranking changes were recorded for the following provinces:

- Dolnośląskie, Lubelskie, Lubuskie, Łódzkie and Pomorskie – in the iterative pattern method,
- Lubelskie, Lubuskie, Łódzkie as well as Pomorskie and Śląskie – in the iterative method.

All (applied) methods indicated that in 2015 the highest innovation activity was characteristic for industrial enterprises in Podlaskie province. It seems that the pattern-anti-pattern development method is a valuable one, both in the original and iterative version, as it combines the results of methods using two extreme reference points through the geometric mean.

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## Effective Support of Transfer Technology on Regional Level

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**Abstract:** In recent years, there has been a rapid expansion of the regional government role in economic development. This has resulted in the fact that technology transfer is taking place within an increasingly complex network of regional stakeholders. And in order to efficiently design programs that support enterprise innovation, entrepreneur's and corporate's environment needs to be constantly monitored and analyzed. These analyses are an effective platform for transfer technology support. Knowledge of the innovative environment in the context of its gradual development is crucial for the effective application of the region's innovation strategy and its tools. One of the questions is to set up indicators of support and measures for transfer technology, research, development and innovation on regional level. At the same time is need determinate an appropriate way of identifying the innovation potential and absorption R&D capacity. The optimization of the system and holistic approach seems to be essential as a basis for setting tools for effective support and measures of transfer technology on regional level.

**Keywords:** Regional Strategy, Transfer Technology, Governmental Support.

### 1 The Regional Government Role in Economic Development

The regional development strategy is a basic document of the regional policy at the level of the state forming the regional policy. It summarizes the objectives, problematic areas and priorities that will be required in the frame of ensuring the regional development policy including business and innovation grow. A political consensus of all involved stakeholder determinate a significant advantage in the system supporting the innovative business and very important part is transfer technology. The regional political representation, universities, and representatives of the major cities in region have to manage to find a common base and came to an agreement regarding goals that are mentioned the Regional Innovation Strategy – RIS of each region [3]. The regional innovation system (RIS) approach provides a useful framework for such a differentiated approach [2]. It draws attention to the firms, clusters, university, research centers and institutions of an innovation system, to the interdependencies [12]. Important role play also regional innovation centers, which can play role as a implementation agency of

supporting programs and the effective implementation of tools that support the development of transfer technology involving both corporate companies and start-up companies and also the field of well-established and fully-developed companies focusing on own R&D [1]. A number of effective programs include, for example, the innovative vouchers. The aim of innovative vouchers is to initiate transfer technology and to bring high added value in implementation in practice. A big commitment is to ensure the greatest possible benefits of investing in research centers for the regional economy [4]. The key approach how to improve the situation is to support innovative small and medium enterprises with a high added value and their attention is focused on innovative and better products and services and also to the introduction of new sell or management approaches [7]. One of the questions is to set up indicators on how to set up support measures for research, development and innovation (R&D). At the same time, it is necessary to choose the appropriate way to identify the innovation potential and absorption capacity of R&D entities and to follow the feedback between the state intervention and its direct impact to the regions. It is essential to set up optimization options for the system to serve as a basis for setting up other supposed proposals for effective support.

## **2 Research Objective**

The aim of the research was to analyze the innovative ecosystem of companies in one of the fastest economical grow region within the Czech Republic, including the socio-economic factors that influence it. In addition, an effort was made to describe the behavior of companies in the field of innovation implementation and transfer technology to follow factors such as the export rate, the number of employees employed in the development activities of the company, the share of university educated employee and the share of investments in own R&D activities. Identify the correlation between the owner/manager's innovation aspirations to create a segmentation that is important for creating a specific supply of transfer technology policy tools to the target group.

## **3 Description of Data Source**

In the work was applied a combination of quantitative and qualitative research and the mutual penetration of these two methods. In the simplified model of the three phases of such mixed research, the sample structure is as follows: determination of research questions, secondly data collection and thirdly data analysis. The basis of the research activity for the work was a structured background for interviews, not a questionnaire, but a sophisticated interview, which had to be properly prepared in advance, to study the documents for each company, for example from the annual reports of companies. There were involved 50 companies. A two-hour interview could only be carried out with the company owner, in the case of foreign companies, it was possible to conduct the interview with the CEO or general manager only. In both cases, the most important criterion was that the manager/owner is responsible of the company's innovation

strategy and is holder of transfer technology strategy in company. For the selection of companies, three main criteria have been identified, which are described below. This was a multi-criteria selection. The first criterion was the company's knowledge intensity, this criterion was given by the minimum volume of investments in own research or development activities, depending on the company's performance, emphasis was given on rapidly growing technological SMEs. In the Czech Republic, there are 419, 444 trading companies, which were registered in total in 2014. There were 2, 391 R&D workplaces. 629 companies invested more than CZK 10 million in R&D in 2015 [11]. The resulting sample for the interview was designed to include companies with relatively high R&D expenditures to the company's total turnover. The reason for emphasis on the knowledge intensity of firms is the fact that the innovative capacity of the company in the higher level of innovation determines to a large extent the critical size of financial, technical and other capacities concentrated in R&D. However, this does not mean that insufficient attention is paid to innovations that do not require their own R&D. Another criterion was the level of active involvement in R&D projects during the last 3 years. Last criterion was classification according to the Classification of Economic Activities (CZ-NACE). This criterion was based on the key sectors for the Czech economy according to the NACE classification. For selected data were use results of Annual report of The Czech Statistical Office (CZSO) is a central body of the state administration of the Czech Republic [10]. The following areas of NACE were selected: 28 - mechanical engineering, 26 - electronics, 29 - automotive, 25 - metalworking, 62 - IT.

### **Description of Region**

The South Moravian region has a traditionally strong and expanding base in the research and development area of higher education students and scientists and industry. It is currently one of the most economically growing regions of the Czech Republic and one of the most dynamic regions in Central Europe. According to the extent of R&D capacity, the South Moravian Region has the most suitable conditions for the development of the knowledge economy. Its share in total expenditure on R&D in 2015 amounted to 20.3% of total expenditures in the Czech Republic. The share of GDP is 10.5%. The share of the South Moravian region in the Czech Republic according to the R&D capacities in the sector of "high education" reached 27.4% according to the employees and 33.8% according to R&D expenditure in 2015. The large difference in the share of expenditures and employment in R&D in the higher education sector is related to extraordinary investments of research centers [8]. This information was drawn from the Regional Innovation Strategy of the South Moravian Region 2014-2020.

## **4 Methodology**

### **4.1 Software Used**

There were selected IBM's software, named IBM SPSS Statistics. This software provides tools for the statistical analytical process, including reports and outputs important and useful not only for statistics but also for company management and their employees, and can also serve municipalities in decision-making on strategic regional development. The name of this software was derived from the Statistical Package for Social Sciences (SPSS) as a statistical package for social sciences, reflecting the original focus on a particular market, but today it is used in other areas including health and marketing, development and innovation.

### **4.2 Statistical Methods**

Data was processed and analyzed using the following methods. A correlation analysis illustrates the statistical dependence of two quantitative variables and measures the mutual relationship of two variables. Both variables are correlated if certain values of one variable tend to occur together with certain values of the second variable. The aim of the correlation analysis is to determine the linear dependence between the variables. The first idea of the dependence of the characters  $X$  and  $Y$  can be obtained by observing these characters in statistical units and showing the data with a point diagram. It is a diagram in which each pair of observations  $(x_i, y_i)$  is represented as a point in a rectangular coordinate system where a scale of the  $x$  and a vertical scale of the  $y$  values are located on the horizontal axis. The points drawn are then a set from which to trace the characteristic features of both characters [6]. The correlation shows the statistical dependence of two quantitative variables (it measures the mutual relationship of two variables.) The two variables are correlated if certain values of one variable tend to occur together with certain values of the second variable [5]. The original data source is .xls files and contains numeric variables. Which were imported into IBM SPSS Statistics software. In the work was applied a combination of quantitative and qualitative research and the mutual combination of these two methods.

### **4.3 Data File Variables**

The following variables were tracked: Export of company in % of total turnover, expenditure on research activities % of turnover. Company own resources for research activities in % to all sources R&D, subsidies % of total R&D expenditures, the number of R&D expenditures for the last 3 years. Ownership structure, Czech, mixed (share of foreign owners below 50%). The share of university educated employees.

#### 4.4 Set the Hypothesis

H0: The rate of export does not correlate to how the firm invests in its own research and development.

H1: The rate of export correlate to how the firm invests in its own research and development.

H0: The level of university educated employees does not correlate with the amount of R&D expenditure and transfer technology.

H1: The level of university educated employees correlate with the amount of R&D expenditure and transfer technology

H0: The level of university-educated employee does not affect the rate of export.

H1: The level of university-educated employee affects the rate of export

## 5 Result of Research Analysis

**Table 1.** Table captions should be placed above the tables. Correlation of individual variables.

		Expenditure	Export	University Employee	Firms Source	Subsidies
Expenditure	Pearson Corr.	1	.289*	.378**	.277	-.277
	Sig. (2-tailed)		.049	.009	.059	.059
Export	Pearson Corr.	.289*	1	.368*	.050	-.050
	Sig. (2-tailed)	.049		.011	.737	.737
University Employee	Pearson Corr.	.378**	.368*	1	-.117	.117
	Sig. (2-tailed)	.009	.011		.432	.432
Firms Source RD	Pearson Corr.	.277	.050	-.117	1	-1.000**
	Sig. (2-tailed)	.059	.737	.432		0.000
Subsidies	Pearson Corr.	-.277	-.050	.117	-1.000**	1
	Sig. (2-tailed)	.059	.737	.432	0.000	
Last 3years Increasing	Pearson Corr.	.265	-.234	.079	-.048	.048
	Sig. (2-tailed)	.071	.113	.599	.751	.751

\*Correlation is significant at the 0.05 level (2-tailed). \*\*Correlation is significant at the 0.01 level (2-tailed).

*Expenditures - R&D expenditure % of turnover, Export – Export % of total turnover  
University employee -% university share of all employees, Firm Source RD - Own resources of R & D company %  
Firm Source RD - Own resources of R & D company %*



*Subsidies - R & D subsidies obtained from the total R & D expenditure  
Development of the last 3 years - The rate of increase in R & D expenditure over the  
last 3 years*

H0: The rate of export does not correlate to how the firm invests in its own research and development.

H1: The rate of export correlate to how the firm invests in its own research and development.

Result: Reject null hypothesis, accept H1

H0: The level of university educated employees does not correlate with the amount of R&D expenditure and transfer technology.

H1: The level of university educated employees correlate with the amount of R&D expenditure and transfer technology

Result: Reject null hypothesis, accept H1

H0: The level of university-educated employee does not affect the rate of export.

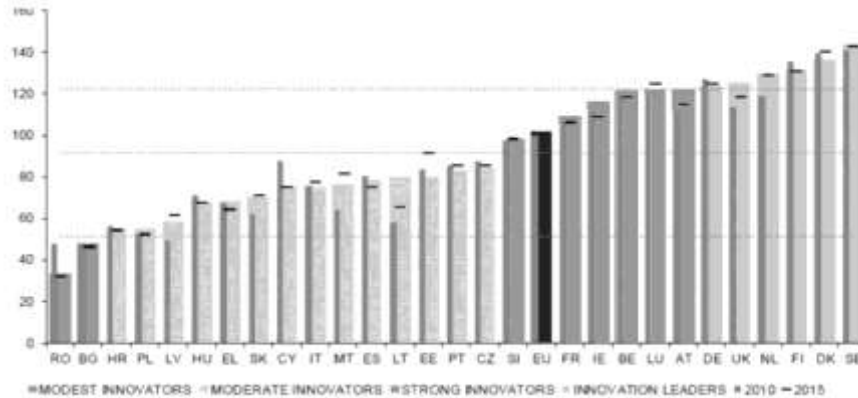
H1: The level of university-educated employee affects the rate of export

Result: Reject null hypothesis, accept H1

## **6 Interpretation and Usability of Results**

When we are monitoring the correlation between the export rate of firms and investment in its own research and development, a statistically significant correlation can be observed in this case, the correlation value is 0.289. This result confirms that exports (in particular to demanding markets such as the USA and Japan), are a significant stimulus for investment in own R& D activities and support global business and innovation ambitions. There is an obvious correlation between R&D expenditure and the number of employees that the company has, the correlation value here is 0.378. The third statistically significant correlation that has emerged is between exports and the number of university employees with a value of 0.368. It can therefore be assumed that factors such as the rate of export and the number of university educated employed workers are also related to the degree of innovation that the company involved into the production process. In the case of monitoring the ownership structure, it is interesting to see the correlation between the ownership structure and access to its own R & D. Interestingly, companies with foreign capital are trying to invest more than Czech origin companies. In part, this finding may rebut the assertion that the Czech Republic would be just assembly companies. This finding is probably due to the fact that the region, where was conducted the research, is region where foreign companies have their development center in the Czech Republic, not just production and assembly. Many companies are in the process of generational exchange, and this is also related to the form of a strategy that is not expansionary in these cases, but rather to maintaining existing positions. Several factors pursued by the European Commission have been followed up in this research (see methodology). Below is a graph showing the comparison of aspirations to national innovations, prepared within the Report Union Scoreboard 2017. The graph shows that the Czech Republic, from the point of view of

the aspiration to innovation, holds the position of so-called moderate innovation, which was proven also in frame of this research.



**Fig. 1.** Performance of EU Members State's innovation system. Source: Report Union Scoreboard 2017. (From left side: moderate innovation, modest innovation, strong innovation, innovations leader) [9].

## 7 Conclusion

Factors influencing the degree of innovation and transfer technology focus in companies and thereby increasing their added value on the market are several and have a different character. The presented research shows that there are different linkages and correlations between the different factors. Precisely mapping and analyzing can be one of the guides to effectively set up innovation policy and to choose the appropriate instruments to support transfer technology on regional base level and support innovation policy at regional and national level as well. As it has been already emerged from the research for the future innovation capacity of the Czech Republic, it is important that it significantly boosts the segment of companies that decide autonomously on their overall strategy and strategic innovation. It is advisable to support high added value companies and target their export to demanding foreign markets. The rate of innovation is significantly influenced by the overall business vision. The corporate aspirations and goals of the owners in terms of assessing the innovation capacity of the economy are very important. They form the focus and boundaries of the company's innovation efforts. Due to the effective setting of regional policy instruments, it is interesting to note that the most important innovation barriers in companies with high innovation potential are not financial barriers but are manifested in the area of human resources. New instruments to support the transfer technology should be devised in this respect. Of course, for the final design of long-term effective mechanisms, we need to build on this research and map out the details of each area in detail, so that investing in supporting the innovation capacity brings a significant overall contribution to the economy. (As was the case with, for example, the above-mentioned innovative vouchers). In order to be able to continue to efficiently design programs that support enterprise innovation, we need to constantly monitor the

corporate environment, analyze and then choose effective public support methods. Knowledge of the innovative environment in the context of its gradual development is crucial for the effective application of the region's innovation strategy and effective transfer technology support. According the research support exchange programs between university and companies in the field of human resources can be seen as effective tools of support transfer technology on regional level.

It is clear that well-defined public support programs for applied research and the support of the innovation process can not only benefit to develop research cooperation, but also increase the share of production with high added value overall.

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## Financial Standing of Polish and Czech Agricultural Cooperatives

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**Abstract.** Cooperatives are relevant entities of socio-economic country development. In agricultural sector they play a significant role. However, there can be observed clear differences in market position between cooperatives from different countries. The objective of this paper was to investigate the differences in financial standing between Polish and Czech agricultural cooperatives. The analysis consisted of comparison of the following indicators: total assets, fixed assets, total liabilities, net profit, total revenues and ROE. The Emis Intelligence Emerging Markets Information Service was used to obtain the data from approximately 200 Polish and 80 Czech agricultural production cooperatives (APCs). The results of the U-Mann-Whitney test confirmed the existence of statistically significant differences between Polish and Czech cooperatives. In considered period (2013-2016), total and fixed assets, total liabilities, net profit, as well as total revenues were higher in Czech cooperatives, while ROE was lower. The findings provoked the authors to formulate five propositions of possible reasons of this phenomenon for further analyses.

**Keywords:** Agricultural Cooperatives, Role of Cooperatives, Cooperatives Business Model, Financial Standing, Profitability.

### 1 Introduction

European agricultural cooperatives function as business organizations with a great advantage of direct acting as agents of socio-economic development [16]. They actively help to modernize and improve agricultural activities through the accumulation of goods, offering varied services and increasing the supply and employment rates. They manifest their huge potential for socio-economic structures in rural development by responding to the economic, social, cultural and institutional needs. They are also able to provide mechanisms for organizing and managing of material, financial and human resources. Simultaneously, thanks to the democratic management procedures, cooperatives can respond in a higher degree to the expectations of their members, helping them to increase confidence in the joint action and aspirations.

Cooperatives play a significant role in the agricultural sector, regardless of the development degree of a country [19]. Notwithstanding, there can be observed clear differences in market position between cooperatives from northern or western Europe and those from CEE countries [5, 9]. The first ones represent modern forms of economic activity and expand their structures strengthening the bargaining power of their members [11, 18]. The second ones are mainly smaller in terms of membership and turnover and, not infrequently, have to face the post-communist impact. Many studies, usually having the character of reports, have described post-soviet cooperatives – their history, current market shares, strengths, the biggest problems and challenges. However, to the best of our knowledge, there has been no analytical treatment of in-depth comparisons between these cooperatives.

This paper, by comparing Polish and Czech agricultural cooperatives, develops a financial approach, contributing to filling this gap. Remembering that a cooperative is a dual organization consisting of a cooperative society and a business firm [15], we focus on the latter and provide exemplary financial measures of cooperative's performance evaluation. Against this backdrop the objective of this paper is to investigate the differences in financial standing between Polish and Czech agricultural cooperatives.

## **2 The Cooperative Movement in Polish and Czech Agriculture**

### **2.1 The Role of Agricultural Cooperatives in Socio-economic Development**

Cooperatives are autonomous associations of people, acting in order to meet their members' needs [12]. Historically, agricultural cooperatives have been the main institutional and organizational tool through which independent farmers were able to withstand the market power held by local and transnational retailers [19]. A number of researchers have investigated their importance in socio-economic development.

Tortia et al. [19] advocate that they "are dramatically important in agriculture". Münkner [12] convinces that cooperatives can be compared to innovators or agents of change in the processes of rural development and poverty reduction. He means that "organized in self-help groups as the losers of rapid change they can improve their own chances to learn how to cope with the challenges of the changing environment" [12]. Further, Münkner claims that cooperatives can also generate new, locally adjusted knowledge. It happens through the knowledge-sharing with external entrepreneurs. He claims that they "experience the positive effects of self-help and group solidarity for improving their own economic and social conditions and for catching up with more advanced competitors by learning from the future" [12].

Melece [10] points out that cooperatives play crucial role in social capital's development. Moreover, she emphasizes that they are recognized as an important instrument for socio-economic improvement of the community. Nembhard [13] agrees by saying that "cooperatives have been found to provide many benefits to communities

and to have significant positive impact on the economy” [13]. Further, she explains that “many co-operatives create jobs, improve working conditions and provide superior employment benefits. As local businesses, cooperatives increase community economic development and sustainability, and recirculate resources” [13]. Cooperative ownership enhances community relationships (community-business partnerships), wellbeing, leadership development, and women’s and youth development.

The argument for scholars is also the emphasis of advantages of cooperatives over the other types of enterprises. For example, Borzaga et al. [4] claim that cooperatives “often achieve economic and social outcomes that are better than those obtained by conventional enterprises and public institutions” [4]. Besides, they are able to coordinate collective action and manage common resources better. It happens by generating, motivating and governing the interaction of their stakeholders in implementing the organizational mission. Moreover, there is quite a lot of evidence that cooperatives survive crises better than other types of business [3]. Cooperative survival rates are longer than conventional small businesses [13]. The long history of cooperative movement can serve as the confirmation of this statement.

## 2.2 Agricultural Production Cooperatives in Poland and Czech Republic

A cooperative is a widely common form of agricultural production in both analyzed countries. Agricultural cooperatives function in all of agricultural sectors, taking the most part in some of them (table 1. based on [2]). For example, cooperatives play a significant role in dairy sector.

**Table 1.** Cooperative market shares in Czech Republic and Poland in agricultural sectors (%).

Country	Dairy	Pig meat	Sheep meat	Wine	Fruit and vegetables	Cereals
Czech Republic	66	25	20	8	35	n/a
Poland	72	n/a	n/a	11	n/a	7

In post-communist countries, like Poland or Czech Republic, a specific model of agricultural cooperatives still exists. The cooperatives in agriculture under the communist regime denoted agricultural production cooperatives (APCs), in fact collective farms [5]. These cooperatives are the subject of the research in this paper. Initially, after the World War Second, APCs were spontaneously established by the farmers themselves who pooled their land, livestock and equipment in order to farm together for high return achieved via the utilization of economies of scale. Later, they became a tool for collectivization. Despite the forced membership to these cooperatives, the objective of their members was homogenous. However, over the years also land-less people could join the cooperative. This implied mixing two different objectives and the interest of the cooperative became heterogeneous. Nevertheless, in times of command economy, they were an important link throughout the food chains.

After the collapse of the communist regime, APCs had to face the requirements of the capitalist market. It turned out that to a large extent they met the requirements, because many of them actively work to this day. Currently in Poland, there are more than 700 of APCs with 40 000 members [6]. The average size of the cooperative is 350 hectares and the employment rate – 60 people. They are situated mainly in the South West and the Northern regions of Poland. Most of them (70%) specialize in plants growing, producing cereals and industrial oil seeds (30%). But their business includes also animal husbandry: pig (about 400 000) and cattle (about 60 000). Some of these cooperatives have multiple activities (services, secondary production, etc).

In Czech Republic APCs are important part of agriculture [2]. Their main function is primary production, providing agricultural commodities and environmental services [6]. They associate mainly land or asset owners and their geographical scope is rather local. The study of Chloupkova [5] shows that Czech APCs are almost 7 times bigger than Polish and have far more shares in total agricultural area. Simultaneously, Chloupkova [5] indicates, that Polish APCs are more productive in than their Czech counterparts and explains this difference as the effect of the different level of collectivization under the communist regime in both countries. However, her findings refer to the period from almost 20 years ago and have not been statistically verified. Therefore it is justified to make an in-depth analysis of comparison Polish and Czech APCs.

### **3 Data and Method**

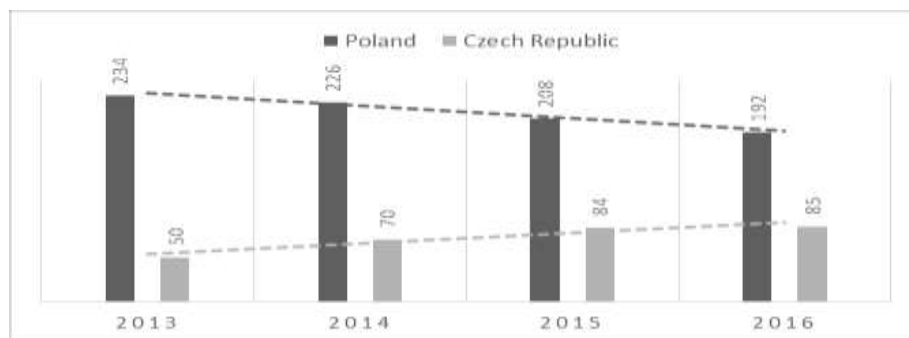
According to the objective of the study described in this article, the basic purpose of its empirical part was to statistically verify whether there are differences in financial standing between the groups of cooperatives operating in Poland and in the Czech Republic. The analysis consisted of comparison of the following indicators: total assets, fixed assets, total liabilities, net profit, total revenues and ROE. The choice of these indicators was made to show a relatively wide range of financial situation of compared groups. The assets could serve as evaluation of general wealth of cooperatives, the liabilities – refer to the financing structure, the revenues show the ability to generate income for members and the profit and ROE determine the profitability, although it is not so important in case of cooperatives [4].

The Emis Intelligence Emerging Markets Information Service was used to obtain the data. The analysis was done in STATISTICA program. In order to achieve the research objective, a test of comparisons between groups was used. Because the research populations were significantly different in numbers, it was necessary to use the non-parametric equivalent of Student's t test for independent trials – U-Mann-Whitney test. While Student's t-test compares the group's averages, the U-Mann-Whitney test compares the ranking results of a dependent variable [8]. The assumptions of the U-Mann-Whitney test, that the independence of the measurements against each other and that the dependent variables were measured at least on the ordinal scale, were met. The following formula of statistical hypotheses was adopted [17]: null hypothesis H0: the averages in the groups are the same, alternative hypothesis H1: at least two

averages differ between each other. The verification of hypotheses consisted in rejection of the null hypothesis in favor of accepting and adopting its alternative, while maintaining the significance level  $\alpha = 0,05$ . Rejection of the null hypothesis would indicate the existence of statistically significant differences between the compared populations. The static results were supplemented with a graphic presentation using a box and whisker plots.

## 4 Research Results

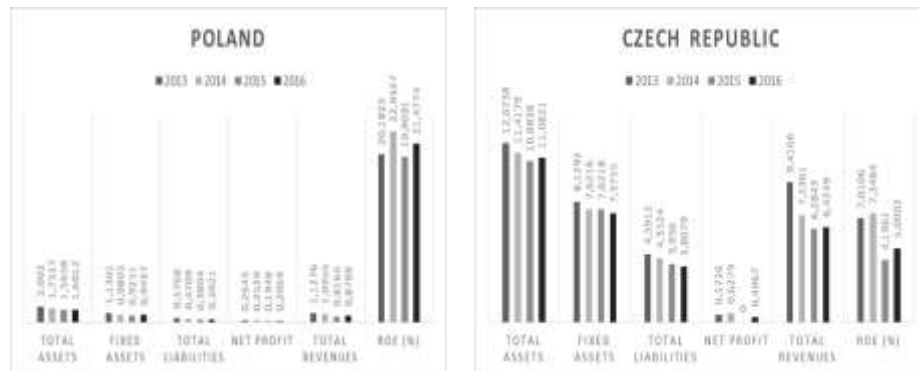
The studies concerned on the comparison of the situation of Polish agricultural cooperatives and their Czech counterparts. Due to formal reasons, all operating entities could not be qualified for the study, which is why the authors used the following filters: Sector: Poland - according to the NAICS Classification - main areas of activity: Agricultural Crops, Animal Production and Aquaculture; Czech Republic: according to the CZ-NACE Classification - Crop and Animal Production, Hunting and Related Service Activities; Status: run an economic activity. The time range of the analysis covered the period of 2013-2016. Fig. 1 shows that in the sample there were much more Polish than Czech cooperatives, but in the case of the latter ones their number was growing, while the other ones – it was decreasing.



**Fig. 1.** Number of cooperatives in the sample in Poland and the Czech Republic in 2013-2016.

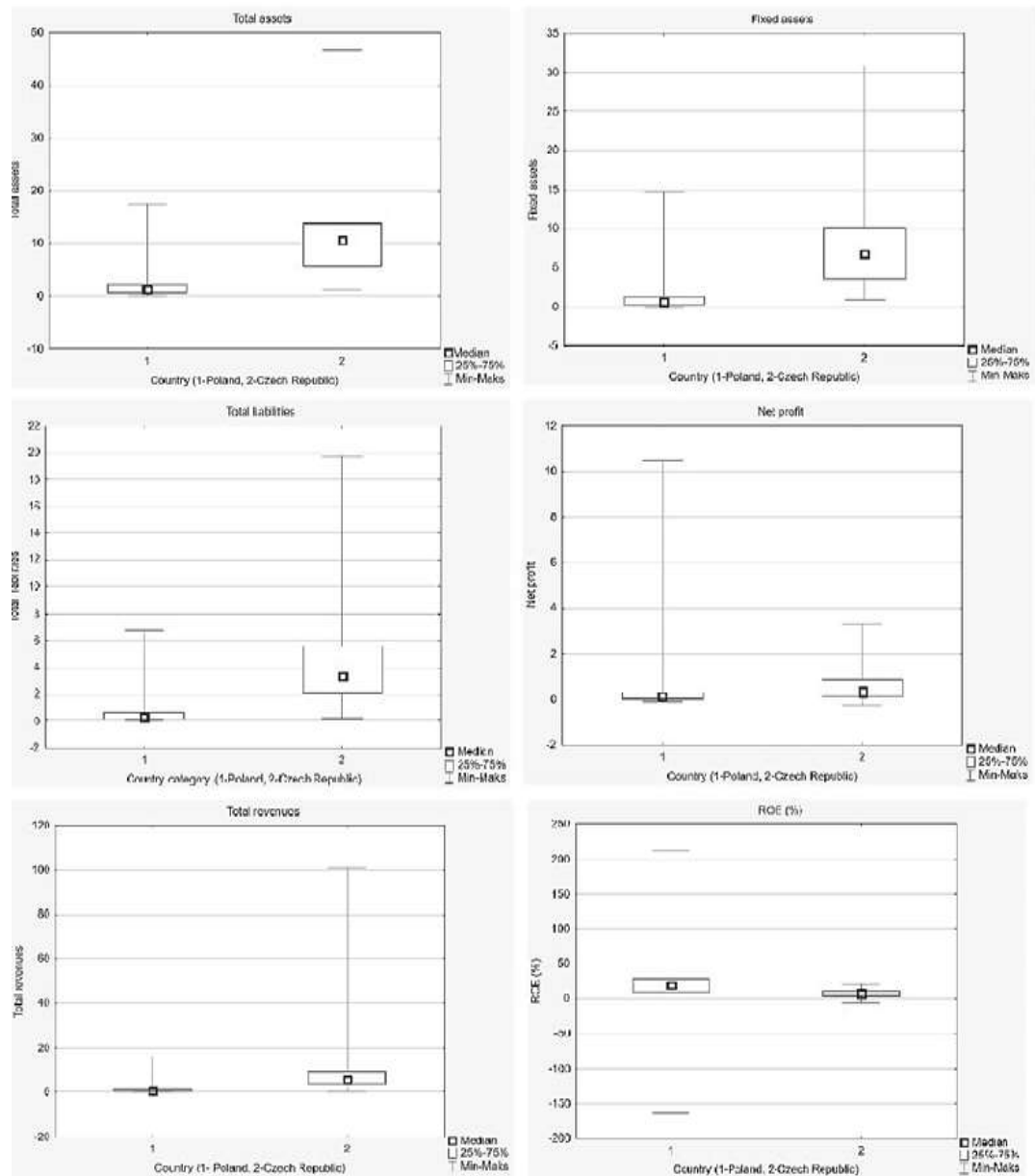
The analysis of differences between cooperatives in Poland and the Czech Republic in 2013, starts a comparison between the average in the analysis range of indicators (Fig. 2). This comparison shows that Czech cooperatives achieve better average financial results. Only in the scope of ROE Polish cooperatives lead the way.





**Fig. 2.** The average results in the area of analyzed indicators in Polish and Czech cooperatives.

In order to have a full picture of the situation, it is worth to also look at the box and whisker plots prepared in terms of the medians for each indicator (Fig. 3). The frame whisker-charts prepared for subsequent years taken for analysis, also served to elaborate a summary of the present research, however, due to the limited volume of publication, only the charts for 2013 were included in the article.



**Fig. 3.** The frame-whisker charts for all analyzed indicators in 2013.

The results of the U-Mann-Whitney test confirm the existence of statistically significant differences between Polish and Czech cooperatives (table 2). In considered period, total and fixed assets, total liabilities, net profit, as well as total revenues are higher in Czech cooperatives, while ROE (%) is lower.

**Table 2.** The results of the U-Mann-Whitney test with the p-values and the medians of Polish cooperatives in the comparison to their Czech counterparts

	p-value 2013	median 2013	p-value 2014	median 2014	p-value 2015	median 2015	p-value 2016	median 2016
Total assets	0.000000	higher	0.000000	higher	0.000000	higher	0.000000	higher
Fixed assets	0.000000	higher	0.000000	higher	0.000000	higher	0.000000	higher
Total liabilities	0.000000	higher	0.000000	higher	0.000000	higher	0.000000	higher
Net profit	0.000003	higher	0.000000	higher	0.000297	higher	0.000004	higher
Total revenues	0.000000	higher	0.000000	higher	0.000000	higher	0.000000	higher
ROE (%)	0.000000	lower	0.000000	lower	0.000000	lower	0.000000	lower

The results presented in the table show that agricultural cooperatives functioning in Poland and their Czech counterparts, statistically differentiate them in terms of all indicators taken into consideration in the study. Thus, it could be concluded that Polish and Czech cooperatives differ significantly in terms of financial results.

## 5 Discussion and Conclusion

Czech and Polish agricultural cooperatives have a similar business history. They operate in similar climatic and natural conditions, which is important when we think of their agricultural profile.

Furthermore, they operate on similar markets that are regulated by the same EU requirements. However, despite these similarities, they have different financial standings. This contradiction provokes to look for the reasons of those differences.

First, Czech cooperatives are larger in terms of the members numbers [5]. In turn, this may be the cause of adopting different business models. In Poland the members of agricultural cooperatives work together on one farm - a cooperative. Czech cooperatives associate individual farms that trade with their cooperatives but don't work together. Yet, there is no in-depth research on relations between the business model and the bargaining power and financial standing of Czech and Polish agricultural cooperatives. Consequently, taking into account the considerations about the impact of the agricultural cooperatives business model on their bargaining power and financial standing the following propositions could be formulated:

*Proposition 1:* there is a relationship between the business models of agricultural cooperatives and their bargaining power;

*Proposition 2:* there is a relationship between the business models of agricultural cooperatives and their financial standings.

Second, despite the fact that Czech and Polish agricultural cooperatives both have a post-communist business history, they were and still are developed in different national cultures. These national cultures can be the basis for different approaches to cooperative actions. Consequently, the following proposition might be formulated:

*Proposition 3:* the culture of cooperatives affects the business model of agricultural cooperatives.

The last but not least cause of the financial standings differences between Polish and Czech agricultural cooperatives may be the differences in the management of these entities. From this point of view, there emerges a large research field. Research can be carried out both on the organizational and micro fundamental levels. Consequently, the following proposition might be formulated:

*Proposition 4:* the organizational and micro fundamental management differences cause the financial standing differences of Czech and Polish agricultural cooperatives.

Moreover, it should be considered whether the indicators such as total and fixed assets, total liabilities, net profit, total revenues and ROE are appropriate and sufficient for evaluating the financial standing of Czech and Polish agricultural cooperatives. The evaluation of cooperatives performance is more difficult than in the case of investor-owned enterprises [14], because “cooperatives are autonomous associations of persons, designed to meet their members’ needs” [12] and for this reason “cooperatives have the tendency to use more debt than IOFs” [14]. Thus, this not-for-profit oriented business gives agricultural cooperatives members higher, satisfying prices for supplied products, thereby decreasing the total profit [9]. Other features of the financial structure of cooperatives are as follows:

- “most of the cooperative’s share capital has to be held by the members who take part in its economic activity,
- shareholding does not determine the member’s rights in the cooperative,
- any return on paid-up capital must be at a limited rate,
- part of the cooperative’s reserves is indivisible and cannot be distributed to the members” [7].

Therefore, taking into account the financial structure of cooperatives it is right to accept that “most of the commonly used financial measures give an incomplete picture of a cooperative’s performance” [1]. Consequently, the following proposition might be formulated:

*Proposition 5:* in the evaluation of the agricultural cooperatives’ financial standings, profit indexes per member might be calculated apart from typical profitability ratios.

Cooperatives have been operating on the market of many European countries for many years. Although many researchers are interested in these types of enterprises, there are still research gaps. Filling these gaps is not only cognitively interesting, but it is also important from the community point of view because cooperatives are relevant entities of socio-economic country development.

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## Hierarchical Challenges in Social Enterprises

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**Abstract.** The authors recognized that there can be certain hierarchical improprieties in some of social enterprises. Precisely, they investigated the organizational situation consisting of the simultaneous overlapping of hierarchical relationships, connecting the superior and subordinate, running in opposite directions. The purpose of the article was to determine the implications of disturbed hierarchical relationships (DHR) in social enterprises. The literature overview revealed that (DHR) could have destructive consequences in an organization. The four following areas which could be negatively affected by the DHR were identified: the overall performance, decision-taking process, conflicts and the quality of superior-subordinate relationships. The results of preliminary empirical research on 23 social enterprises in Poland contradicted these findings. The authors explained this with the accepted methodological limitations on the one hand, but also the possibility of specific leadership and organizational culture in the surveyed enterprises on the other hand.

**Keywords:** Hierarchical Relationships, Chain of Command, Democratic Management, Social Enterprises, Cooperatives, NGO.

### 1 Introduction

Social enterprises are a specific form of organizations for which profit in the economic sense is not the only goal. The difference between such an entity and a standard enterprise is that the first one does not seek to maximize profits, nor does it pay dividends to its owners. Of course, social companies run a classical business, but they transfer financial surpluses to achieve the social goal [5]. The purpose of a social enterprise is to implement a specific public benefit point, whereas the business activity is a mean to achieve this purpose.

Social enterprises operate mainly with the intention of professional and social integration of vulnerable or already socially excluded groups. They are created to eliminate the negative effects of unemployment, especially among people with disabilities, women in a difficult life situation, representatives of national minorities, people with low qualifications or after a stay in a prison [13]. They are able to see potential in these employees, which is used in various fields of their activity, self-financing jobs for these people.

Although social enterprises operate within various organizational and legal forms, most often as a non-governmental organization, a cooperative or even a company, in

addition to the goal, they are combined by one, overriding value – a human being. Social enterprises see the most valuable capital in people and act for them, often allowing them to participate in both current and strategic management. Such a noble idea sometimes turns out to be difficult to implement, because there is a need to consider many voices, needs and expectations, which are not always the same.

The relatively broad right and the ability of employees to decide about less and more important matters related to the organization complicates the arrangement of hierarchical relationships in organizations. They are often subject to disturbances, which can have both positive and negative effects on various areas of the organization. The purpose of the article is to determine the implications of disturbed hierarchical relationships (DHR) in social enterprises. In particular, the authors intend to examine the organizational situation consisting of the simultaneous overlapping of hierarchical relationships, connecting the superior and subordinate, running in opposite directions.

## **2 Data and Research Method**

Conducting the research included the preparation of a survey questionnaire, and then sending it to approximately 400 respondents in electronic form, using traditional mail or during a direct meeting. The survey was addressed to the leaders of social enterprises. The territorial scope of the survey included the Lower Silesia Voivodship in Poland. In the study, the selection of the sample was random and based largely on self-recruitment. The authors are aware that such a method of selection has limited possibilities to deduce from the sample to the entire population. However, it should be remembered that other methods of selecting the units to be tested in this case would probably be even less effective, in particular when it comes to obtaining a satisfactory level of sample implementation. In this context, it should also be mentioned that one of the most important aspects was in this case receiving feedback from as many respondents as possible.

Nevertheless, only 23 respondents filled out the questionnaire, which means that the total rate of responses' return was almost 6%. Their characteristic is presented in table 1. In the sample there were mainly non-governmental organizations and social cooperatives. They are relatively young – established a few and a dozen years ago. They act mainly in education, construction, production, health and beauty, but also in such fields as: gastronomy, consulting, accountant and office services, cleaning or recreation and tourism. They serve mostly local and regional market, but some of them have also national or international scope. They are relatively small in terms of number of employees. They employ workers/members in a difficult situation mainly due to disability, old age and lack of education.

The survey was preliminary research, in which respondents were asked about their opinion. Therefore, the obtained data is subjective. The aim of the empirical research was just to find out whether the disturbed hierarchical relationships occurred in analyzed organizations and whether they negatively influenced the overall performance, decision-taking process, conflicts and the quality of superior-subordinate relationships.



**Table 1.** Basic characteristics of the research sample.

Legal form		Established		Industry		Scope		Number of employees	
NGO	13	1990-2003	2	Education	7	Local	8	Up to 5	8
Social coop.	9	2004-2013	15	Construction	4	Regional	5	6-10	2
Other	1	2014/later	6	Production	3	National	6	11-20	7
				Health/beauty	3	Internation.	4	21-50	5
				Other	14			51-250	1

### 3 A literature Overview

In a workplace unique interpersonal relationships with important implications for the individuals and the organizations exist and develop [6]. Among different workplace relationships one of the most important are the relationships between superior and subordinate [1, 6, 12]. A typical example of such relationship is the hierarchical relationship which results from the division of authority (the power to make decisions) [10]. It is often replaced by the term “chain of command”, “scalar chain” or “line of authority”. According to its original proponent H. Fayol and his scalar principle, from the lowest to the highest position in an organization a clear and uninterrupted line of authority should be observed [4, 7]. In other words, hierarchical relationships should be directed from top to bottom – from supervisor to subordinate [11].

Additionally, the deep subject considerations of the representatives of praxeological trend in the theory of organization and management have led to the conclusion that hierarchical relationship, described as “official relationship”, is always, bearing in mind one case, one-sided [17]. However, this does not eliminate the possibility of occurrence of official relationship between the same team members inversely directed bearing in mind another case. Moreover, this allows a change of direction of the relationship between the same members in another case of the same type [18]. Thus, theoretically there may exist a situation in which two workers, even supervisor and his subordinate, simultaneously are connected by hierarchical relationships running in opposite directions.

Although the analyzed problem seems to be entirely theoretical – what would happen if the subordinate had a bigger power than his supervisor? – it is reflected in the practice of some organizations, including especially social enterprises. It could occur for example in social cooperatives, whose members have the ownership and are at the same time employed. Out of all the members, belonging to the general assembly, the supervisory board monitoring the activity of the whole cooperative and management board, is selected. The managerial positions in a cooperative, including also the boards, can be taken by employees from outside the members, who bearing in mind their position supervise other members – also those who belong to the supervisory board. In such way, the tangle of hierarchical relationships is formed.

The disturbances in chain of command could have some consequences in an organizations. According to Fayol, “the clearer the division of hierarchical relationships

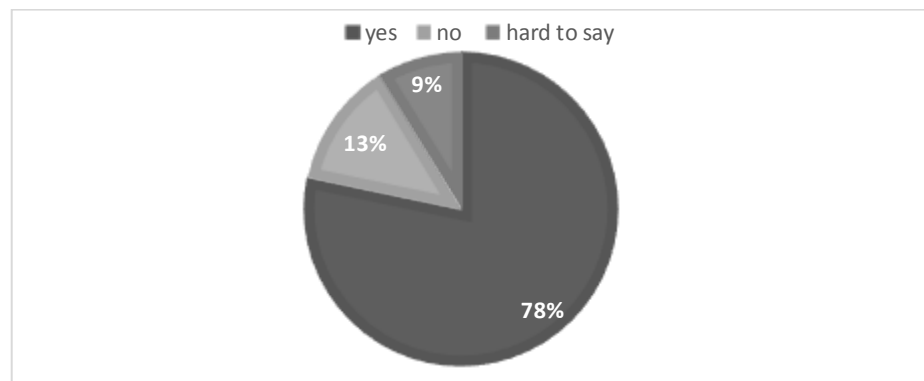
is, the more effective the process of decision taking, and effectiveness become” [quote for 4]. Hart and Moore [8] recognized that “crisscross” hierarchies were never optimal. Also, J. C. South and K. Matejka [15] drew the attention to the existence of the so-called multiple weak links in the chain of hierarchical relations and their influence on the general results of an organization. Therefore, it can be claimed that the disturbed hierarchical relationships do not favour the overall organization performance.

Syriopoulos and Tsatsaronis [16] convinced that the unification and integration of the command chain implies a faster decision-taking process. Oginni et al. [12] and Sanner and Bunderson [14] emphasized that it helped to avoid confusion, conflicts and stalemates. The research by J. W. Kassing [9] indicated the existence of both constructive and destructive consequences of circumvent by employees the chain of hierarchy in the context of supervisor-subordinate relations. As pointed out by Abu Bakar and Mustaffa [1], the superior-subordinate communication behaviour plays an important role in affecting the quality of the relationship between superior-subordinate and group commitment.

From the various studies adduced so far, we can identify a following organization fields which could be affected by the disturbed hierarchical relationships: the overall performance, decision-taking process, conflicts and the quality of superior-subordinate relationships. This study verifies whether this really happens in the practice of some organizations.

## 4 Research Results

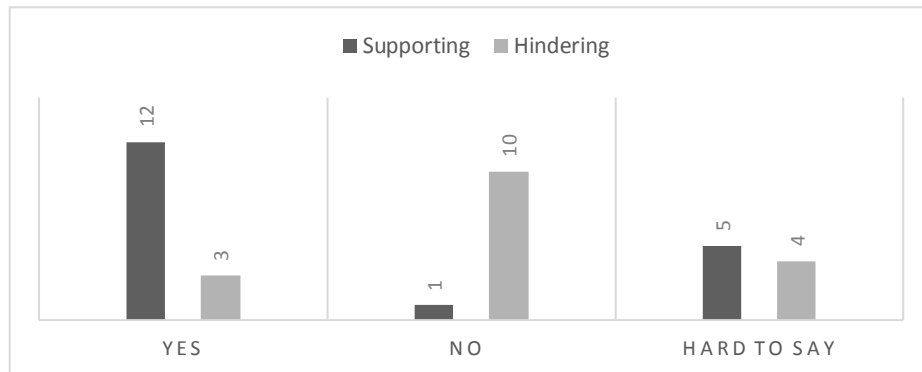
Because social enterprises often enable their workers or members to participate in managing the selected fields or even the entire organization, the respondents were firstly asked to answer the question about the occurrence of such democratization. The results confirmed the above assumption (Fig. 1). Nearly 80% is familiar with the



**Fig. 1.** The occurrence of democratic management.

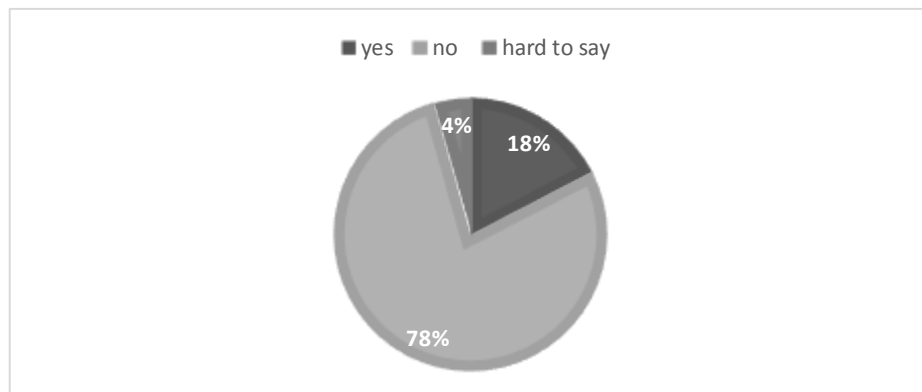
phenomenon of democratization of management, while 13% declared no existence of democratic procedures in managing their organization.

Next, the respondents presented their opinion on the impact of democratization on the current management in the organization (Fig. 2). It turns out that over half of them (twelve answers) claims that democratic procedures support the management and only three deny this statement. Similarly, ten respondents said that, contrary to popular opinion, the democratization did not hinder the management and governance.



**Fig. 2.** The character of the impact of democratization on the current management.

Further, the respondents evaluated the presence of disturbed hierarchical relationships in their organizations (Fig. 3). Precisely, they were asked to answer the following question: “Does a phenomenon in which a board member is at the same time the subordinate of a given manager occur in your organization?” The authors are aware, that such disturbance in hierarchical relationships is only one in many possible.

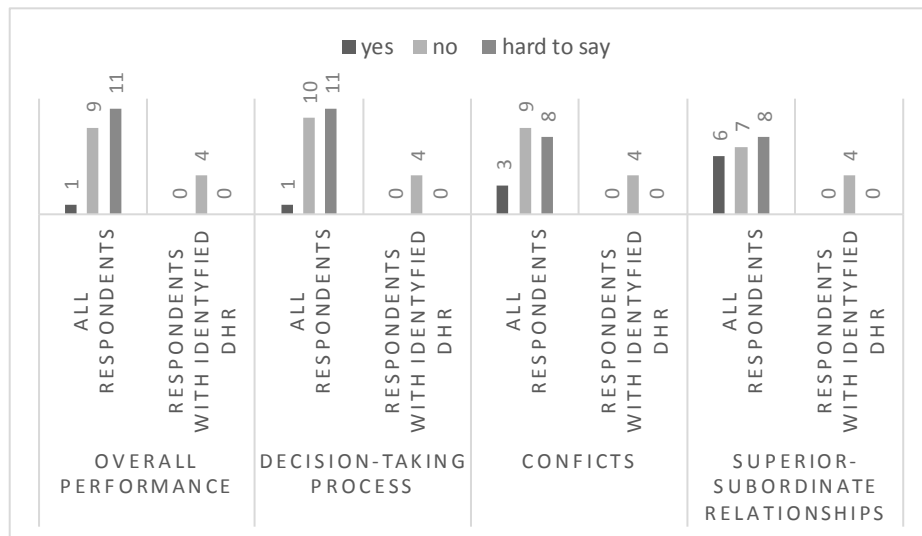


**Fig. 3.** The occurrence of disturbed hierarchical relationships.

However, they simultaneously considered it the most common and easy to understand. The results indicate that, unlike the phenomenon of democratization of

management, DHR are not as frequent. Only 18% confirmed their existence. 78% definitely denied their occurrence.

Finally, the respondents determined the implication of DHR on different fields of their organizations. Precisely, the questions were as follows: “Do you think the DHR affects negatively the overall performance/decision-taking process/the quality of superior-subordinate relationships” and “Do you think DHR causes conflicts in your organization?” The aggregate results in this area are presented in Fig. 4.



**Fig. 4.** The number of answers to the questions about the negative impact of DHR on different fields in an organization.

Taking into account the answers of all respondents, it can be observed that they either had problems with determining the implications of DHR or denied their negative impact. In particular, this applies to areas such as: the overall performance and the decision-taking process. In these cases this was stated by all respondents with one exception. There were, however, three responses in the case of conflicts and six in the case of a supervisor-subordinate relationship suggesting that DHR negatively affect these fields.

However, the most valuable were the comments of these respondents, although few, but who found the existence of DHR. It turned out that they all denied the negative impact of DHR on all analyzed areas. Thus, they definitely undermine the significance and consequences of disturbances in hierarchical relationships.

## 5 Discussion

The conducted survey revealed the unexpected findings. Unexpected, because they provide no support for the results of the above reviewed researches. The opinion of

peoples who work in unclear chain of command conditions, showed no correlation between the occurrence of DHR and the general effectiveness of an organization and the speed of decision making. This contradicts the findings of Fayol, Hart and Moore, South and Matejka, as well as Syriopoulos and Tsatsaronis [4, 8, 15, 16]. There is also no explicit confirmation, that disturbances in hierarchical relationships causes more conflicts and confusion, as it was in Oginni's et al. [12] and Sanner's and Bundersons's [14] works. On the basis of the research results this paper argues also the negative impact of DHR on superior-subordinate relationships, which denies the findings of Abu Bakar and Mustafa [1] and only partially agrees with Kassing [9].

However, the authors suggest caution in interpreting the obtained results due to the limitations of the research sample and the adopted research methodology. Firstly, the sample was very small, what definitely does not allow to inference about the entire population. And secondly, the collection of information included only the opinion of the respondents and not objective, hard data based on operationalized terms and concepts. The latter seems to be more reasonable and reliable. Some of the respondents presented their opinion on issues that do not concern them, which additionally gives a certain view, but also inclines to think about the reliability of the results.

On the other hand, the findings of this paper, despite being limited in interpretation, can be also considered as valuable because they provoke to think deeper about the disturbances of hierarchical relationships in social enterprises. Therefore, the authors pose questions indicating further directions and areas of research.

First of all, since the findings have shown that there is no destructive influence of DHR, are there any indications that this influence could be considered as constructive [9]? Do they support management procedures in social enterprises? In this context the authors suggest searching for also the positive implications of DHR in different fields in organizations.

Moreover, since the findings contradict the current literature conclusions on the negative impact of DHR, it should be determined why it is so. The authors advocate two possible ways of explanation for this phenomenon. First suggest to investigate the role of the leadership, managerial competences and the division of authority. For example Aghion and Tirole [2] prove that there is a difference between "formal authority" related to power, control and "real authority" combined with leadership, the ability to influence subordinates. The elimination of negative consequences of DHR may be connected with using the "real authority" by the superior over his subordinate. Such practices may help to avoid potential conflicts and control the tangle of hierarchical relationships.

The second explanation refers to very essence and specificity of social enterprises. They are entrepreneurial organizations that do not have as their main objective the maximization of private returns (net surpluses or profits), but the protection of their members through the satisfaction of their needs [3]. Hence, the workers/members' awareness of this purpose could be stronger than the desire to use and show the position in the hierarchical structure. It should also be noted that social enterprises are relatively small and young and associate often peoples with social problems (e.g. social cooperatives). Therefore the values like entrepreneurship, dynamic development and

willingness to act also for the common good could overcome the importance of internal conditions of the organizational structure and the possibility of using the formal power.

## 6 Conclusion

Hierarchy exists in every organization. Thus, the chain of command has a great importance. However, in employee-managed firms it often gains complexity by entanglement of hierarchical relationships resulting from enabling employees to participate in management. The situation of simultaneous overlapping of hierarchical relationships between supervisor and subordinate passing in opposite directions induces dualism of the chain of command. This, in turn, could have negative consequences for different fields in an organization.

However, as shown above, in social enterprises it has special features and it manifests in a specific way. This paper developed an approach of considering hierarchical problems in social enterprises. Precisely, it investigated the situation consisting of the simultaneous overlapping of hierarchical relationships, connecting the superior and subordinate, running in opposite directions. On the basis of the literature overview it revealed that such disturbed hierarchical relationships (DHR) could have destructive consequences in an organization. The four following areas which could be negatively affected by the DHR were identified: the overall performance, decision-taking process, conflicts and the quality of superior-subordinate relationships. However, the results of preliminary empirical research conducted on 23 social enterprises in Poland contradicted these findings. The authors explained this with the accepted methodological limitations on the one hand, but also the possibility of specific leadership and organizational culture in the surveyed enterprises on the other hand.

Nevertheless, taking into account the discussed and concluding remarks it seems to be justified to conduct more sophisticated research on hierarchical problems in social enterprises. Eventually, the conducted research gives a certain important view on the analyzed issues, and its contribution can be used for a broader analysis of the functioning of social companies.

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## Women in the Labor Market - an Example of the Podkarpackie Voivodeship

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**Abstract.** The paper focuses on the issues of self-efficacy and career orientation of women. These issues are particularly important in the context of dwindling labor resources and increased interest of women in professional activity. In addition, the responsibility for the shape and course of the career has been shifted towards an individual as its implementer. The aim of the paper is to get to know women's opinions about self-efficacy and to identify their orientation towards their careers. The research was carried out on a group of women from the Podkarpackie Voivodeship employed or self-employed. Their results demonstrated that the respondents are convinced of their own efficacy, but they do not assess their ability to achieve the expected results highly. Efficacy in solving problems can be used by employers with whom they would like to get involved for a long time. They are also aware of the importance of their knowledge and practical skills in their professional life. They strive to pursue a career within one organization, focusing mainly on horizontal displacement. They are flexible, have a high mobility propensity, but this is especially the case of internal mobility. Harmonious integration of private and professional life is essential for them. Less important is independent action, gaining new management positions and socially useful activity. They have a moderate need for creativity and taking on challenges. Taking into account the obtained results will contribute to the broader use by employers of the potential of women.

**Keywords:** Changes in the Labor Market, Women, Self-efficacy, Career Orientation.

### 1 Introduction

Numerous socio-cultural, political and economic transformations are the features of modern times. There are also changes in the labor market, among which demographic trends, especially the aging of societies, are particularly unfavorable. This situation is important for the economic situation as it affects consumer demand as well as the supply of labor resources. Demography was recognized as one of the fundamental development challenges for Poland [18]. The labor market is also becoming more and more diverse (taking into account such criteria as gender, ethnicity and others, the importance of the emotional aspect of work is also growing) [2]. The use of diverse knowledge and experiences, predispositions and sensitivity [7] of employees enables



organizations to gain benefits related to, among others, customer relations, human resources management, relations with the environment, the situation within an organization, as well as financial benefits and society [19].

Unfavorable trends in the labor market in Poland result in searching for ways to use optimally the potential of available labor resources. At the same time, an increase in the role and importance of women for economy [16] and their interest in professional activity [10, 23] make organizations identify new sources of recruitment of potential employees, including women [19].

At the same time, research shows that women have a low opinion about themselves, they are reluctant to take up professional challenges, risks, and are also afraid of working in a high position [14]. In addition, the need to reconcile work and family responsibilities often make it difficult to pursue a career.

The presented premises lead to seeking solutions that provide conditions that will enable the organization and women to achieve their goals and objectives. Lack of support can result in the loss of valuable employees and, as a result, can have a negative impact on the employer's situation. The contemporary career, despite the fact that the burden of responsibility for its shape and course has shifted towards an individual as its implementer [5], is managed in the organization [2]. Therefore, it is important from the organizational perspective to use the potential of women as employees and to engage in their career.

The aim of the paper is to get to know women's opinions about self-efficacy and to identify their orientation towards their careers. In order to achieve the goal the literature on the subject was analyzed, numerical data published by the Central Statistical Office was used, and empirical studies were conducted on a group of working women from the Podkarpackie Voivodeship. The study describes demographic changes taking place in Poland, with particular emphasis on the Podkarpackie Voivodeship. It shows the importance of self-efficacy and specific orientations in a career. The results of empirical research were presented and subjected to the qualitative analysis.

## **2 Changes in the Labor Market in Poland and the Podkarpackie Voivodeship (Selected Aspects) – the Condition and Prospects**

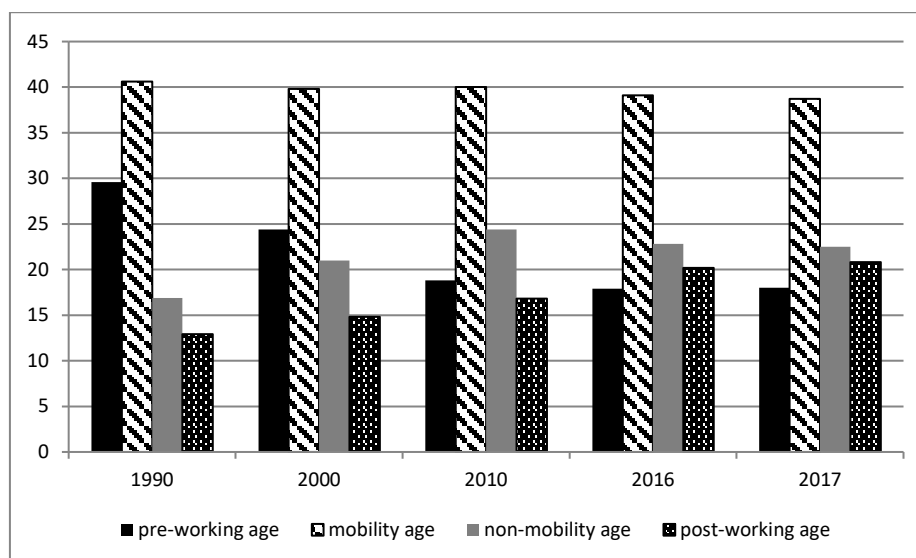
In Poland, unfavorable demographic trends take place, among which a decline in population and aging of the population is most visible. According to the estimates of the Central Statistical Office, the population of Poland in 2050 will amount to 33.95 million, which means a drop by almost 4.5 million (11.7%) compared to the end of 2017. This trend in the Podkarpackie Voivodeship will be even less favorable, as the estimated decline will amount to 12.16%.

The majority of Poland's inhabitants are women (51.6%) - there are 107 of them per 100 men. This value is differentiated taking into account the age criterion. Men predominate in the population up to 49 years, in the remaining group the feminization rate is on average 125, the higher the age group, the higher the value of the rate. It has remained unchanged since 2010 and according to forecasts, as time passes, it will

decline to 105 in 2050. In the Podkarpackie, women also constitute the majority, but their share in the population structure is slightly smaller than the average in Poland (51%), the feminization rate is 104. For this region, also in 2050 lower values than the national average ones are expected - the share of women will decrease slightly to the current state and will amount to 50.8% of the population, while the feminization rate will be 103.2.

At the same time, the value of the age median will increase by almost 41 years in 2017 and is estimated at 52.5 in 2050, but it will be higher for women (54.8 years), while for men it will reach 50.1 years. Such the result means the aging of the population (the median statistical age of a Polish citizen is constantly growing - since 2000 by more than 5 years, and since the beginning of the 1990s by more than 8 years). For the statistical inhabitant of the Podkarpackie it will be even higher, and it will amount to 53.9 in 2050 (for men 51.9, for women 55.9).

The result of changes in demographic processes are changes in the structure of population in economic age groups. In 2017, the working age was dominated by people of working age, which accounted for 61.2% of the general population (Fig. 1). This group was dominated by people of the mobility age (18-44 years) - their share amounted to 38.7% of the population, while those of non-mobility age (45-59 / 64) accounted for 22.5% of the population. Children and youth (0-17 years) accounted for 18% of the population, and post-working age people (women - 60 years and more, men - 65 and more) 21%. The population structure according to economic age groups has changed unfavorably since 1990 - the percentage of people in post-productive age has increased - from 12.9%, and productive - from 57.5%, with an increase in the group of people of non-mobility age. The share of people in the pre-working age (from almost 30%) decreased significantly. These unfavorable tendencies will be deepened according to estimates and in 2050 the population structure according to the criterion of economic age groups will be as follows: 14.6% of the population will be people of pre-working age, up to 48.8% will decrease the percentage of people of working age, but will significantly increase a share of people in post-working age to 36.5%. Even less advantageously, these trends will be shaped in the Podkarpackie Voivodeship where children and youth will constitute 13.6% of the total population, people in the post-working age of 37.5%, and in working age 49%.



**Fig. 1.** Population by economic age groups (in %) in 2017 [6].

An important measure indicating the relationship between individual economic age groups of the population is the age dependency ratio which reflects the number of people in non-productive age per 100 persons of working age. The value of this ratio has been increasing for several years - in 2017 it was 63 and 55 in 2010. Particularly important, however, are the partial ratios - the number of people in the pre-productive age to the working age and the number of people in post-productive age to productive age. The value of the ratio for people of pre-working age has remained unchanged for several years and has been 29 since 2010, while the value of the ratio for post-working age increased to 34 in 2017. Such a relationship is unfavorable for the situation in the labor market as it means that the share of future labor resources is smaller than the share of those who have already left the labor market. Prior to 2010, both relations were more favorable: in 2000 they were 40 to 24, and in 1990 - 52 to 22.

According to estimates, in 2050 the age dependency ratio will be 105, while the value of the pre-production age ratio will be 30 and post-working age will be 104, 28 and 77 respectively. It indicates a less favorable situation than the average in the country.

An important issue in the context of changes in the labor market is the professional activity of the population (Table 1). Research conducted among people aged 15 and more shows that over half of people in this group were professionally active in 2017 (56.2%), which mainly concerns men (65.1%) and less than half of women (48 %). Since 2010 the value of the ratio for both groups has been slightly fluctuating, but it has increased for men, while for women after the initial increase it is falling. The upward tendency is characterized by the general employment rate, showing the percentage of people working in the professionally active group, which value is up to 53.7%, as well as for individual groups - for males up to 62.2%, for females up to 45.8%.

**Table 1.** Economic activity of population (in %) [6].

Specification	2010	2015	2016	2017
<b>Activity rate</b>	<b>55.3</b>	<b>56.2</b>	<b>56.2</b>	<b>56.4</b>
Men	63.7	64.6	64.8	65.2
Women	47.6	48.4	48.3	48.4
<b>Employment rate</b>	<b>50.0</b>	<b>51.9</b>	<b>52.8</b>	<b>53.7</b>
Men	57.8	59.8	60.9	62.0
Women	42.8	44.7	45.3	46.1

Bearing in mind the unfavorable demographic trends in the labor market in Poland, resulting primarily in the shortage of labor resources, and at the same time increasing an interest of women in professional activity, it is necessary to strive to benefit from their potential. For this purpose, it is necessary to diagnose the current condition regarding the possibilities and needs of women.

### 3 Self-efficacy in the Professional Activity of the Individual

Self-efficacy, i.e. an individual judgment of one's own abilities, an ability to achieve the expected results [1], concerning the individual's beliefs about their ability to engage in a specific field of behavior [4]. Generalized self-efficacy, however, explains the wide range of human behavior [16] and reflects the individual's ability to cope with problems (difficulties, obstacles) in different situations [14].

Self-efficacy affects the individual's well-being, thinking, motivation and action [1], their choices, the effort involved and perseverance in the implementation of their efforts [3]. It is therefore important for the professional activity of the individual. People with strong conviction about their own abilities are willing to take on challenges, set more difficult goals, which leads to interest in and commitment to the activities carried out. They are more persistent, even in the event of failure. They have a sense of exercising control over difficult situations [14].

The conviction of self-efficacy is one of the factors determining the level of development of basic cognitive, self-management and interpersonal skills [1], necessary for professional activity and career management, as well as expected by employers [15]. Self-efficacy expresses the image of the individual's competence, its equipment with the means to carry out the intended activities [14]. It is a significant determinant of undertaking a specific action and its continuation.

### 4 Career Orientation as an Image of Oneself in a Career

Career orientation [12] or career anchor [21] is a set of talents and abilities perceived by the individual, basic values, motives and needs related to a career [20]. Its importance stems from the impact on career choices, decisions regarding the choice and

change of the profession, working conditions, as well as the employee's reactions to their professional experience. The career anchor shapes values important in the life of an individual, determines individual views on the future [13].

The identification of career anchors enables an organization to find a match between organizational and individual needs. The career anchor directs the employees' efforts and indicates the actions that can be taken to achieve career goals [13]. Eight career anchors are identified [11, 20]:

- Technical/Functional Competence – related to the concentration on the internal, technical aspect of the work content and functional area of work,
- Managerial competence – related to the pursuit of vertical promotion for a managerial position, which is a means to achieve a sense of success,
- Autonomy/Independence – concerns situations related to the performance of professional duties, in which the entity is as limited as possible by organizational requirements in the use of its professional competences,
- Security/Stability – applies to both geographical security (investing in a stable lifestyle in a specific geographical area), as well as employment security,
- Entrepreneurial Creativity – related to the aspiration to obtain a new result by the individual – development of a new product or service, set up their own business,
- Service or dedication to a cause - related to devotion to others and making the world a better place to live and work,
- Pure Challenge – refers to overcoming difficult obstacles, solving difficult problems and winning with the most talented opponents,
- Life style – related to the pursuit of lifestyle development, integrating the family and professional aspect with care for self-development.

The career anchor reflects the relationship between the character of the career chosen by the individual and its motivations and needs, the declared hierarchy of values and perceived competences.

## **5 Research Methods**

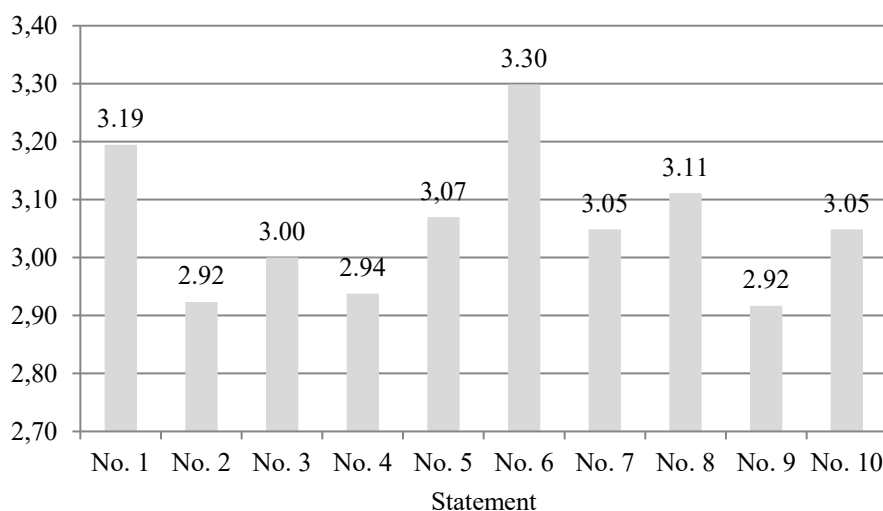
The questionnaire of the polish version of the Generalized Self-Efficacy Scale (GSES) by R. Schwarzer and M. Jerusalem [14] was used in the research, consisting of 10 statements. Answers were given on a four-level scale, where 1 means the answer "no", 2 – "rather not", 3 – "rather yes", 4 – "yes".

Career orientation was examined using a short version developed by Schein [1985] Career Orientation Inventory (COI) by Igarria and Baroudi [1993]. The inventory contains 25 statements, of which 15 related to the importance of each of the issues related to career (assessed on a scale from 1 – "no importance" to 5 - "centrally important"), and another ten related to preferences for careers assessed on a scale from 1 - " not at all true " to 5 – "completely true". The use of a short version of the questionnaire was justified by specific needs resulting from the purpose of the study, as well as the standardization of the research tool and the reduction of time-consuming use of it.

## 6 Research Results

Studies were carried out in the Podkarpackie Voivodeship from May to June 2018. 300 working women – employed (regardless of their form) or self-employed workers were invited to the research. 288 questionnaires were obtained (96%). The average age of women was 29.2 years, the average professional experience was 6.26 years, of which 84 women (29.17%) had experience longer than five years. The majority of respondents (61.8%) were single people. Respondents lived mainly in the city (59%).

Individual indicators were calculated as average values from responses to statements specifying sense of self-efficacy in a career (fig. 2), as well as career orientation (table 2). The results of the conducted research indicate that women are convinced about their own efficacy, but their assessment of the possibilities and ability to achieve the expected results is not high - it amounts to an average of 3.05.



**Fig. 2.** Self-efficacy in career - average results from respondents' answers.

Women are the most convinced that they can solve majority of problems if they put enough effort into it (average result 3.30), and in case of difficult problems they struggle hard enough (average result 3.19). However, they assess the lowest their efficacy in troublesome situations in which they do not know what to do (2.92) and in situations of opposition from other people (2.92). Women also declare that they would not be able to cope with unexpected events (2.94).

The analysis of career orientation results showed that women were the most job-oriented, which ensures them employment stability – the result of 4.77 significantly distinguishes out of the others (Table 2). Individuals anchored in the security sphere are looking for an employer with whom they could become emotionally involved, be loyal to him, which translates into career planning within the organization [22].

**Table 2.** Descriptive characteristics of respondents' answers regarding career orientation.

Specification	Average result
Technical competence	4,33
Managerial competence	4,19
Autonomy/Independence	4,04
Security – Job tenure	4,59
Security – Geographic	3,64
Entrepreneurial Creativity	3,84
Service or dedication to a cause	3,95
Pure Challenge	3,67
Life style	4,21

Women are aware of the growing importance of knowledge and skills – they are strongly anchored in technical competences (average result 4.33). This means that it is important for them to be an expert in a specific field and to confirm their own championship. The obtained result proves that horizontal promotion is satisfactory for them. Such orientation, however, due to the rapid changes in technology, requires continuous updating of knowledge, acquiring new knowledge and improving skills in order to remain competent.

The lifestyle (average result 4.21) is of lesser importance for the respondents and managerial competences (average result 4.19). The first result means striving for harmony between various aspects of life, especially professional, personal and leisure time [22]. The expectation of flexible working time and mobility should be explained by the multiplicity of roles that women perform in society. However, managerial orientation is associated with well-developed interpersonal, leadership and emotional skills, as well as the skills of integrating one's own work and the team, which go beyond the technical aspect of the job. Individuals with this orientation strive to gain new experiences in managerial positions, increase the scope of power and make decisions about financial consequences [22]. Their advantage is responsibility for the organization's results and identification with its success.

Women declare lesser inclination to act independently (average result 4.04). This means that they are moderately interested in broadening the scope of their independence, and at the same time taking over responsibility for the implemented activities. They expect flexibility while accepting organizational rules and restrictions. The work of an independent specialist is only appropriate for some of them.

Women are also averagly oriented to socially useful activity – providing help and support to others (average result 3.95). To this extent, they also have developed social needs. They are moderately interested in achieving significant results that go beyond the professional context related to earning income (eg improvement of the environment, safety of other people or interpersonal relations).

Respondents declare a relatively low level of skills and motivation in the field of entrepreneurial creativity (average result 3,84), which means that they feel the moderate need for creativity and creation of new products. The challenges marginally motivate them to act.

The worst women are anchored in geographical stability (average result 3,64). This means that they have little predisposition to stabilize their lives in geographical terms – settling in a specific region and abandoning the displacements proposed by the employer. They accept the risk related to a change of place of work or residence.

## **7 Conclusion**

The current demographic situation in the Podkarpackie Voivodeship and trends in this field should be assessed as unfavorable for the labor market. The decline in population, the increase in the age median and the value of the age dependency ratio constitute the reason for the dwindling labor resources. At the same time, the increase in the professional activity of women, as well as the employment rate in this group, leads to interest in using their potential.

The research indicated that the inhabitants of the Podkarpackie Voivodeship declare the ability to solve serious problems. Efficacy in solving problems can be used by employers with whom they would like to get involved for a long time. Employment stability proves the aspirations of women to achieve employment and a certain remuneration in an unstable environment, which will ensure their safety in private life. They are willing to submit to the leadership of other people, do not aspire excessively to take up management positions. A career within an organization, taking into account primarily horizontal displacements, is beneficial for them – they score highly on the level of development of their interpersonal, emotional and teamwork skills. Women are flexible, show a high propensity for mobility, but this is especially the case of internal mobility.

Activity without restrictions related to bureaucracy and autocratic management style is not significant for them. They also do not strive to initiate change, to take calculated risk, to become independent. Women are not focused on rivalry, searching for new solutions, overcoming barriers and limitations. It is more important for them to achieve balance between family and career activities than independence and entrepreneurship. Therefore, employers should invest in their development and provide conditions for flexible work.

The results regarding the sense of self-efficacy in a career are important for employers due to the fact that the level of motivation, affective states and actions of the individual depend to a greater extent on its perception of the possibility of a specific action than on the objective state [3]. Self-perception is significant for professional activity, because a human prefers a profession that is compatible with their abilities, interests and aspirations. An individual strives to carry out a job that creates opportunities to use their own competences [8]. However, knowledge about career orientation is useful both for an individual planning a career or intending to change its current course, as well as for employers supporting employee activities in career management. Taking into account the issue of self-efficacy and career orientation of women, will contribute to the broader use of their potential by employers.

The research was conducted on a group of women from the Podkarpackie Voivodeship, which is not a basis for generalizing the obtained results to the entire



population of the country or even the region. The respondents' answers may also be influenced by other characteristics that have not been included in this research.

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## Intergenerational Transfer of Knowledge in Polish Enterprises in the Perception of Employees

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**Abstract.** The paper has a theoretical and research character and aims to diagnose opinions of employees representing various generations on the flow of knowledge between the distinguished generation groups in their workplace. The study is based on the assumption that the intergenerational transfer of knowledge is currently one of the most important factors determining the market situation of enterprises. Simultaneously, the economic practice proves that effective knowledge management in an organization is a relatively difficult and complex process. The first part of this paper presents the importance and limitations of knowledge transfer in an organization. Next, various generations on the contemporary labour market were described. The survey research was conducted among 895 employees, representing 829 business entities (the research was carried out in the academic year 2017/2018). On this basis, the final conclusions were formulated which show that the age of respondents influences their perception of knowledge transfer in organizations. Significant differences in the assessment of knowledge exchange made by the representatives of different age groups based on a clear tendency to more positively assess own generation group have been noticed. The research presented in this article does not allow for a clear conclusion which generation is more involved in the intergenerational exchange of knowledge since the assessment of the openness of employees to share knowledge depends on the age of those who evaluate it. Representatives of the baby boomers' generation highly assess their readiness to share knowledge, but the perception of younger age groups does not confirm this phenomenon.

**Keywords:** Knowledge Transfer, Generations, Baby Boomers, Age Management.

### 1 Introduction

Preservation and development of organizational knowledge, which is the basis for shaping the competitive advantage of enterprises, constitutes, at the same time, one of the key challenges of contemporary management. Knowledge transfer is still not a solution commonly and effectively used in many organizations. It is also worth noting

that in the second decade of the twenty-first century, the circumstances and conditions of this transfer are changing quite significantly due to the fact that four different generations of employees cooperating with each other are present on the current labour market.

This creates new opportunities, but also problems in the area of knowledge exchange within an organization. Difficulty of this task is raised by the fact that there are many antagonisms and prejudices based on established stereotypes between age-diverse employees [1, 6]. Representatives of particular generations are guided in their lives by different values, have different customs and habits, prefer different methods of learning and information exchange, and build their professional and social relationships in different ways. Understanding and intergenerational communication, including the transfer of knowledge, are becoming more and more difficult due to such differences.

Taking into account the value and importance of the above circumstances for development of enterprises, the aim of this work is to analyze opinions of employees representing various generations on the flow of knowledge between the distinguished generation groups in their workplace. The author's research, which had the form of a survey, leads to the verification of a research hypothesis assuming that the perception of intergenerational transfer of knowledge depends on the age of the respondents and each age group positively assesses the openness of its own generation to share knowledge and critically evaluates other generation groups in this respect.

## **2 The Importance and Limitations of Knowledge Transfer in an Organization**

The key role of knowledge in shaping the competitive advantage and development of an enterprise is highlighted by a great number of researchers, including P. Drucker [5], R.J. Howlett [8], K. Ichijo and I. Nonaka [9]. Knowledge enables an organization to survive in a turbulent environment; it allows the organization to make more effective decisions and predict their effects, implement innovations and streamline management processes [11]. Therefore, it should not be surprising that enterprises more often implement knowledge management systems, which include processes of knowledge acquisition, multiplication, storage and usage [12]. In this context, the importance of knowledge for the development of an organization is unquestionable.

However, it is worth noting that according to G. Probst, S. Raub and K. Romhardt knowledge is always associated with a specific person [15]. As a result, the level and usage of knowledge depends on actions undertaken by people, and therefore, is related to their experiences, emotions, motivation and intentions, that is mainly their mental sphere [19]. On this basis, it can be stated that acquisition, accumulation and exchange of knowledge in an organization are relatively difficult processes to observe, measure and analyze.

The knowledge management process is determined by many factors, both internal and external to the organization [16]. An important advantage in this respect should be the fact of possessing by the enterprise the age-diverse staff, as it opens the possibility of an extremely valuable knowledge transfer between employees with different

competencies and experiences. In this area, every employee can constantly deepen their practical knowledge and acquire new skills, which is a prerequisite for professional development, increase in creativity, flexibility and openness to new solutions. This concerns both older and younger employees. Thus, it has an influence on their work results and, consequently, the results achieved by the entire enterprise.

On the basis of numerous practical experiences, however, it can be noted that the effective intergenerational transfer of knowledge is a very difficult task to accomplish. It requires goodwill and commitment on the part of employees, their openness and mutual trust, yet these are not frequent phenomena in many organizations. When employees have to convey their knowledge to other employees, they come with great caution or even fear [16].

The above restrictions in knowledge transfer result from both personal and organizational reasons [13]. The first group of barriers includes: fear of losing the current professional position at the expense of co-worker's development, lack of willingness to listen and respect people from other generations, prejudices as well as deficiencies in the area of knowledge transfer. Among the organizational obstacles to knowledge exchange are: lack of practices promoting work in multigenerational teams, approval of discriminatory behaviour on the grounds of age, failure to prepare older employees to take the role of mentors or lack of formal roles and tasks in the area of knowledge transfer assigned by the managerial staff.

### **3 Generations on the Contemporary Labour Market**

The current personnel situation of the majority of organizations is characterized by a large age diversity of employees. This results from the fact that in enterprises can simultaneously work representatives of up to four generations: baby boomers, generation X, generation Y and generation Z. The high complexity of managing such diverse staff is influenced by the fact that each of these age groups has different needs, requirements, expectations and attitude to professional and private life. These differences result from both the period in which these people were born and educational opportunities and socio-economic realities in which they were growing up.

It is worth noting here that the division of society into generation groups in terms of the year of birth differs slightly in particular countries and geographic regions. This results from differences that characterize countries in the area of global demographic changes, economic crises or phases of the technological progress.

Baby boomers are representatives of the population growth which followed the Second World War in the years 1945-1960. The motto of this generation is hard work and care not to lose it. Baby boomers live to work and are loyal to the employer [14]. Therefore, they seldom change their workplace and position. They believe that only work is the path to the professional success. Representatives of this generation appreciate independence. Their strength at work is commitment, optimism and a global view of problems. Baby boomers, however, feel uncomfortable in a conflict situation and may be reluctant towards their peers [20].

People from generation X were born between 1961 and 1983. They are mature and trustworthy employees. Like baby boomers, they are characterized by their loyalty to the employer. They appreciate the following values: personal development, independence, diversity and diligence. Although representatives of generation X use new technologies without any problems (computers, tablets, smart phones, etc.), they prefer direct contacts and paper archives, not the digital ones. They value the importance of good education and recognize it as a “pass” for a professional career. They are responsible and engaged employees, willing to cooperate with different people regardless of their way of work or communication. They appreciate the balance between work and personal life [17]. However, they are relatively often sceptical and pessimistic. They are distrustful of their superiors and treat their mistakes as personal failures [20].

People born between 1984 and 1995 belong to generation Y, often referred to as Millennials. People from this age group value partner relationships, tolerance, development opportunities as well as new challenges. They show high and unconventional life aspirations. They are able to actively use digital media almost in every area of their lives. They are perfectly prepared to work in realities of free market and globalization. They are usually well-educated and success oriented people, although work is not a priority for them, but rather a “tool” for self-realization. They expect from their employers a satisfying salary and investment in their professional development. They are often regarded as disloyal employees because occupational stabilization is not the most important thing for them. They prefer task and design work with a great degree of freedom in its implementation and flexible working hours [2]. According to research carried out by the University of New Hampshire, the representatives of generation Y are characterized by high self-confidence, high perception of their skills, conviction of their own uniqueness, high expectations and strong aversion to criticism [7].

The youngest people on the labour market belong to generation Z, that is people born after 1995. In most cases, it is a community of times of prosperity. They are people who do not know the world without internet and mobile phones. Therefore, they are perfectly aware of digital technologies. They also highly value the circle of close friends, like friends from social media sites. They care about everything what is “online.” As employees, they gained the name of creative and imaginative multi-taskers, but those who desire a high degree of flexibility and development opportunities leading to success, for which they expect an appropriate reward [3]. For this reason, they usually constitute a challenge for employers who are not always able to provide them with a suitably paid and interesting job. The weaknesses of this age group most often include deficiencies in social skills, problems with concentration and stabilization or superficial analysis and assessment of the situation [10].

#### **4 Research Methodology**

The aim of the study was to diagnose opinions of employees representing various generations on the flow of knowledge between different generation groups in their

enterprises. The following hypothesis was formulated: the perception of intergenerational knowledge transfer depends on the age of the respondents, each age group positively assesses the openness of its own generation to share knowledge and critically evaluates other generation groups in this respect.

The research was carried out in the academic year 2017/2018 on a group of 997 full-time, part-time and post-graduate students from three universities in Białystok, Warsaw and Łomża. The availability of respondents and their diversity in terms of age, gender and place of residence constituted the selection criterion for the examined sample. Professional activity of students in the enterprise sector constituted the condition to be included in the examined sample. In order to limit the number of variables, owners, members of their families and co-owners of the enterprise as well as students of other nationalities and representatives of the managerial staff have been excluded. Therefore, 895 questionnaires were used for further analysis, including 490 completed by women and 405 by men. The respondents represented 829 business entities. The structure of their age is shown in Table 1.

**Table 1.** Age of the surveyed employees.

age	women (n = 490)		men (n = 405)		total (n = 895)		generation
	L	% for a group of women	L	%	L	% for a group of men	
20-25	151	30.9	146	36.0	297	33.2	Z
26-35	104	21.2	94	23.2	198	22.2	Y
36-45	97	19.8	66	16.3	163	18.2	X
46-55	67	13.7	45	11.1	112	12.5	X
56-60	60	12.2	37	9.1	97	10.8	BB
above 60	11	2.2	17	4.2	28	3.2	BB

## 5 Analysis of Research Results

The analysis of data (see Table 2) on knowledge transfer between different generation groups in Polish organizations indicates several regularities. Significant differences in the assessment of the situation made by the representatives of different age groups are visible; these consist in a clear tendency to more positively assess own generation group. For employees aged 55+, the statement that in their workplaces “older people are usually reluctant to share their knowledge with younger employees” is false. The younger the responders are, the assessment of this sentence as true increases. Employees from generation Z assessed it as “rather real” with a large internal consistency of answers. A similar tendency, though not so unambiguous, can be seen in the assessment of the readiness of young people to share their knowledge with older colleagues. The respondents from the 55+ group assessed the statement that younger employees are reluctant to share their knowledge as “partly true, partly false” (the average 3.4, but with a large internal differentiation of answers). In the same range are

the answers of all other age groups, but here the average is always below 3, and in the case of generation X and generation Z there is a great internal diversity of responses, which indicates large discrepancies in respondents' experiences and perceptions. It is interesting that the younger the responders are, the average assessment of the sentence "We are eager to learn from each other regardless of age." as true increases. The oldest employees assess it as "partly real, partly false" (the average 3.4), and the representatives of the youngest age group as "real" (the average 4.0 with a large internal consistency of answers). Statistically significant differences in assessments made by the surveyed women and men were not noticed.

**Table 2.** Intergenerational transfer of knowledge in the assessment of employees – the assessment of the truthfulness of the statements on a scale from 1 (definitely false) to 5 (definitely true).

Category of the answer	baby boomers (n = 125)		
	average	SD	SD <sup>2</sup>
In our enterprise, older people are usually reluctant to share their knowledge with younger employees.	2.0	1.156	1.338
In our enterprise, young people are usually reluctant to share their knowledge with older employees.	3.4	1.216	1.480
In our company, people are reluctant to share their knowledge, regardless of age.	3.1	1.034	1.070
We are willing to learn from each other, regardless of age.	3.4	0.984	0.969
Category of the answer	generation X (n = 275)		
	average	SD	SD <sup>2</sup>
In our enterprise, older people are usually reluctant to share their knowledge with younger employees.	3.3	0.930	0.865
In our enterprise, young people are usually reluctant to share their knowledge with older employees.	2.7	1.213	1.472
In our company, people are reluctant to share their knowledge, regardless of age.	2.9	0.995	0.991
We are willing to learn from each other, regardless of age.	3.5	0.993	0.986
Category of the answer	generation Y (n = 198)		
	average	SD	SD <sup>2</sup>
In our enterprise, older people are usually reluctant to share their knowledge with younger employees.	3.8	0.995	0.991
In our enterprise, young people are usually reluctant to share their knowledge with older employees.	2.9	0.985	0.972
In our company, people are reluctant to share their knowledge, regardless of age.	3.0	0.808	0.654
We are willing to learn from each other, regardless of age.	3.4	0.902	0.815
Category of the answer	generation Z (n = 297)		
	average	SD	SD <sup>2</sup>
In our enterprise, older people are usually reluctant to share their knowledge with younger employees.	3.9	0.693	0.481



In our enterprise, young people are usually reluctant to share their knowledge with older employees.	2.8	1.063	1.131
In our company, people are reluctant to share their knowledge, regardless of age.	3.2	1.024	1.050
We are willing to learn from each other, regardless of age.	4.0	0.402	0.162

SD – standard deviation, SD<sup>2</sup> – variance

In the light of the research results, the hypothesis that the age of the respondents influences their perception of knowledge transfer in organizations has been confirmed. The tendency to more positively assess own generation group has been recognized.

## 6 Summary, Discussion of the Results

The research carried out by B.P. Sharma, M.D. Singh and Neha [18] shows that knowledge sharing significantly limits the existence of competition between employees and their individualism, which may occur at different age; however, these tendencies are more often attributed to the representatives of generations Y and Z. The results published by Polish researchers are ambiguous. On the one hand, the attention is paid to the fact that younger employees more often perceive their knowledge as a source of advantage over other employees and, in this situation, knowledge sharing weakens their position. In turn, older employees are less reluctant to share their knowledge. On the other hand, significant barriers of knowledge sharing by the oldest generation of employees [4] and reluctance of this group to teach younger people [21] have been indicated. The research presented in this article does not allow for a clear conclusion which generation is more involved in the intergenerational exchange of knowledge since the assessment of the openness of employees to share knowledge depends on the age of those who evaluate it. The representatives of the *baby boomers* generation highly assess their readiness to share their knowledge but the perception of the younger age groups does not confirm this phenomenon.

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## The Launching of Medical Devices - the Conformity Assessment and Registration Process in the Czech Republic

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**Abstract.** The issue of launching medical devices is very topical. This is an area that is little described because more attention is paid to medicinal products. This paper aims to comprehensively describe and analyze the theoretical background of current legislation regulating the marketing of medical devices, including other processes related to this issue. The article discusses the concept of medical device, the manufacturer's responsibility and the nature of the notified body. In addition, it describes processes of conformity assessment and registration. Finally, the findings of regulation of medical devices are summarized. Emphasis is placed on the position of the manufacturer as a primary person and the criticism of the absence of a proper legal theoretical examination of all the problems mentioned.

**Keywords:** Pharmaceutical Law, Medical Device, Launching, Conformity Assessment.

### 1 Introduction

The issue of launching medical devices is only a little described in theory, as evidenced by the literary research conducted within the Czech Republic. Medical devices represent a significant and rapidly growing market within the European Union, employing more than 575,000 people, 25,000 companies do business in this field, and total annual sales of medical devices are over 100 billion euros. This is also a very sensitive issue, given the possible effects on the lives and health of not only patients, but also other people [8].

The regulation of medical devices belongs to the field of pharmaceutical law, respectively, to the pharmaceutical law in a wider sense - together with the treatment

of medicinal products or other medicinal products needed, e.g. blood, tissues, or cells [2, 11]. The pharmaceutical law itself is understood as part of medical law. The medical law then focuses mainly on the issue of healthcare workers and the provision of health services or the regulation of public health insurance and other similar areas [16, 12]. It is obvious that while the medical law has, in particular thanks to the current Civil Code, a considerable private overlap and a considerable part of the problem is solved by private law institutes, the pharmaceutical law has retained its distinctly public character. The basis of the relationships within the framework of the pharmaceutical law is the obvious superior relationship of public authorities on the one hand, and basically subordinate physical or legal persons on the other [2].

Due to the large number of types of medical devices, this article focuses only on general medical devices. In the paper, the emphasis is mainly put on the regulation of the launching of medical devices and on the differentiation of the basic differences between the legal regulation of human medicinal products and medical devices.

## **2 Czech and European Legal Framework**

The basis of the Czech legal regulation is Act No. 268/2014 Coll., on Medical Devices. It includes a comprehensive regulation of medical devices, with the exception of conformity assessment and advertising regulation. These include in particular clinical trials or similar processes, documentation of medical devices, production, distribution and import requirements, vigilance and administrative offenses relating to all of these areas.

The current legal base of the European Union is primarily regulated in the field of medical devices by a number of directives dating back to the 1990s. The current Czech legislation is based on these directives, but in some respects it is more advanced than the already outdated European Union directive. The most important directive regulating the issue of medical devices is Council Directive 93/42/EEC, on medical devices, in a consolidated version [1]. Furthermore, Council Directive 90/385/EEC (1990) on the approximation of the laws of the Member States relating to active implantable medical devices in a consolidated version and Directive 98/79/EC of the European Parliament and of the Council in 1998, on in vitro diagnostic medical devices. In addition to the directives, the regulation of medical devices is currently included in Commission Decision 2010/227/EU [4] of 19 April 2010 on the European Databank for Medical Devices (EUDAMED). However, one major deficiency can be found in the European regulation as a whole - each of the directives contains its own definition of the term medical device, which in practice gives rise to considerable terminological confusion. This leads to potentially serious problems in transferring directives - the inconsistency of the definition, the various other definitions of definitions in different countries [11]. In the case of the Czech legislation, for example, these three definitions were fundamentally merged into one, as it can be found in Act No. 268/2014 on Medical Devices and on Amendment to Act No. 634/2004 Coll., on Administrative Fees, as amended [15].

However, the substance of the European legislation on medical devices is currently based on non-binding guidelines and recommendations issued by the European

Commission under the title MEDDEV [4]. The MEDDEVs promote a common approach to be followed by manufacturers and Notified Bodies that are involved in conformity assessment procedures. There are a number of these documents that are narrowly specialized - from the definition of the term medical device to the question of border products or the vigilance process. Unfortunately, in practice, it creates a number of contradictions in the approach to legal regulation of medical devices by the individual EU Member States and divides them. Most countries in Western Europe, including the Czech Republic, have respected MEDDEV so much that they actually took the rules into their national regulations. Some MEDDEV Member States do not take part in their legislation. There is a situation where part of the Member States requires compliance with these documents and others do not. This creates inequality and considerable disparity in terms of requirements and standards within the single market of the European Union as well.

### **3 Government Bodies Operating in the Field of Medical Devices**

The Act on Medical Devices contains only two relevant state administration bodies, specifically the Ministry of Health of the Czech Republic and the State Institute for Drug Control of the Czech Republic. Other bodies of state administration acting in the field of medical devices are the State Office for Nuclear Safety, the Office for Technical Standardization, Metrology and State Testing and the Regional Trade Licensing Offices.

#### **3.1 Ministry of Health**

The Ministry of Health (hereinafter referred to as "the Ministry") is the central public administration body for medical devices. Pursuant to the Act on Medical Devices [15], the Ministry issues a binding opinion on the person's request for authorization to participate in the process of conformity assessment of medical devices (as well as its modification, suspension, or revocation). It also decides to temporarily withdraw a medical device from the market in case it may endanger the health or safety of persons. The Ministry also grants exemptions for the use of a medical device if it does not meet the statutory conditions for use at the request of the health service provider.

The Ministry is also responsible for the administration of the Medical Devices Register (hereinafter referred to as RZPRO). The key area activities of the Ministry are to ensure co-operation with the competent authorities of the member states and the European Union and cooperation with relevant authorities of the third countries and the World Health Organization. The Ministry together with the Institute is the representative of the Czech Republic among the competent authorities of the member states for medical devices. The Ministry also has a decision on appeals for administrative proceedings conducted by the Institute at first instance.

### **3.2 The State Institute for Drug Control of the Czech Republic**

The Institute is the office and organizational component of the state; in the case of medical devices the administrative authority exercising most of the powers. Its scope and authority are based on a number of international treaties and national laws. In the first instance, the special administrative procedure under the Medical Devices Act - decides whether the product is a medical device, the classification of the medical device and whether the CE marking has been unlawfully affixed. The Institute also conducts the process of registration of persons participating in the activities regulated by the Act on ZP (manufacturer, authorized representative, importer, or distributor) and notification of medical devices. The Institute also provides the technical transfer of some data to the Eudamed database.

### **3.3 Other Bodies of State Administration**

The other administrative authorities that deal with medical devices are as follows:

1. The State Office for Nuclear Safety,
2. The Office for Standardization, Metrology and Testing,
3. Regional Trade Licensing Offices.

The State Office for Nuclear Safety (<https://www.sujb.cz/>) is subject to those medical devices that are the source of ionizing radiation. In this case, medical devices are subject to both the Act on Medical Devices and the Law on the Peaceful Use of Nuclear Energy and Ionizing Radiation.

The Office for Technical Standards, Metrology and Testing (<http://www.unmz.cz/urad/unmz>) publishes Czech technical standards - these set out basic factual, not legal, requirements for products (including medical devices). However, the technical standards are not publicly available and their purchase price is relatively high. This office publishes the Bulletin of the ÚNMZ where it publishes information on the new technical standards, but no longer the standards themselves. It is also possible to find information on notified persons (i.e., authorized persons authorized to the conformity assessment process) on the territory of the Czech Republic. This administrative body is subject to the Ministry of Industry and Trade and not to the Ministry of Health.

The competence of regional licensing offices is to supervise the advertising of medical devices. The legislator planned to move this agenda to the Institute, mainly because of the need for a considerable degree of specialization and the associated complexity of staffing. Regional authorities have no longer the capacity for this task. However, this did not happen in the end [20, 17].

## **4 Medical Device**

Any instrument, tool, device, software, implant, reagent, material, or other product intended by the manufacturer to be used, alone or in combination, for one or more particular healing purposes, is to be considered a medical device [9]:

1. setting a diagnosis, prevention, monitoring, prediction, prognosis, treatment, or alleviation of the disease,
2. setting a diagnosis, monitoring, treatment, mitigation, or compensation of injury or disability,
3. examination, replacement, or modification of anatomical structure or physiological or pathological process or condition,
4. provision of information through in vitro screening of samples from the human body, including donated organs, blood and tissues.

The medical device must not achieve its principal intended effect in the human body or on its surface pharmacologically, immunologically or metabolically but its function may be supported by such effects. Medical devices also include products specially designed for the cleaning, disinfection, or sterilization of medical devices and means intended to control or promote conception [6].

The accessory of a medical device is an accessory which, although not a medical device, is intended by the manufacturer to be used together with one or more medical devices to specifically enable the use of the device or devices in accordance with their intended purpose or purpose to specifically and directly support the medical functionality of the medical device or devices with respect to their intended purpose [9].

#### **4.1 Basic Terms – Registration, Notification, Conformity Assessment Process**

The basic concepts which the entire Medical Device Act works with are the registration and notification. The obligation of the registration is restricted only to persons handling medical devices. In the case of the notification, on the other hand, it is a process that applies to the process focused on medical devices, not people. In this, administrative discrepancies can be seen. The registration and notification are also done with RZPRO. Significant concepts include the import and distribution of medical devices. The imports differ essentially from the distribution only in one thing - when imported, the medical device is transported across the borders of the member states. Thus, the object of importation is a medical device acquired outside the territory of the member states. A key concept in the case of imports is launching on the market. The object of the distribution is a medical device which is not imported across the border of the member states, that is, it was acquired in that territory. The notion of delivery to the market is decisive [2].

The conformity assessment process in the Medical Devices Act is not much described. One can only find the statement that it is "a process performed under another legal regulation regulating technical requirements for products." This issue is more precisely regulated in the law on technical requirements for products and further specified by implementing legislation. The conformity assessment is based on demonstrating the safety and efficacy of the manufactured medical device before it is launching on the market. Simplified verification is that the manufacturer has met the essential requirements.

## 4.2 RZPRO and Eudamed

The Register of Medical Devices is a public administration information system for the collection of data on medical devices that are launched in the Czech Republic. The RZPRO itself is managed by the Ministry - the Ministry's administration is limited to the processes and management carried out through RZPRO (and the Ministry can further delegate these powers to the Institute). However, the technical report is carried out by the Coordination Center for Sectoral Health Information Systems. Because of this, regulated entities must always consistently distinguish the nature of their problem in RZPRO's operation - whether the problem is technical or legal in nature (i.e., it is the object of an agenda that is managed by RZPRO or RZPRO itself). The contact places are in fact two - the Institute and the Coordination Center for Sectoral Health Information Systems (<https://www.uzis.cz/link/ksrzis-koordinacni-stredisko-pro-resortni-zdravotnicke-informacni-systemy>). For obligated persons, it is problematic in borderline cases to choose the right institution and procedure.

The data in the system is collected for the purpose of passing information from the Eudamed database and, at the same time, because of the possibility of providing (certain part) of information to the public.

The European Databank for Medical Devices (Eudamed) [3] was established by the European Commission by decision of April 2010. As early as in May 2011, this decision was binding on the member states. Eudamed is authorized to handle data that is essential for medical devices - such as product or authorized representative information. The Eudamed feature is particularly noticeable in terms of vigilance, clinical assessment, functional assessment, and conformity assessment. However, the system by which individual member states transmit the information to the Eudamed database differs - the Czech Republic, thanks to the effective law on medical devices, collects information electronically and can share it more easily and efficiently. However, some of the countries that have the obligation to pass on information do not still use the fully electronic system. Therefore, exchanging information is lengthy, complicated, and often incomplete.

## 5 Launching – Legal Concept and Related Processes

Only the manufacturer or importer can therefore launch the medical device. The distributor himself can never be the one who launches a medical device - the law stipulates that he can only deliver it, i.e., dispose of it only in the territory of the member states - and whether within one or more of them. At the same time, the regulation applies only to the medical devices that may be present on the market – i.e., the medical devices that have successfully undergone clinical evaluation or functional assessment, and have been assessed for compliance. The issue is rather a question of defining the market because it is not in line with the definition of the member state market which is commonly used in literature and practice but it is significantly extended in comparison with this definition. Not only the member states of the European Union but also other countries of the European Economic Area are considered to be member states. Switzerland and Turkey are also covered by international treaties.



### 5.1 The Process of Launching and Processes Related to this

According to Honce [9], a device may only be launched or put into effect if it meets the requirements of the regulation and is properly delivered and properly installed, maintained and used in accordance with its intended purpose. The device must meet the general safety and performance requirements set out in the regulation. Proof of compliance with the general safety and fitness requirements must be a clinical assessment. The launching of medical devices does not require the state to approve it as it is the case with medicinal products. The state gets involved in the process of notification, which takes place within the statutory period, only after the physical launch.

## 6 Conclusion

Thus, the whole process of the introduction of a new medical device on the market can be described as a system of successive processes that is carried out by the manufacturer himself (possibly followed by an importer, a distributor, and an authorized representative) culminating in the marketing of the medical device. The system begins with the manufacturer's assessment of whether or not the medical device is a medical device. Furthermore, the manufacturer determines, according to the legal criteria, the degree of the health risk of the medical device. However, the determination that it is a medical device or the determination of its class is not final at this stage since the notified body may assess whether it is going to be in the process or an administrative body during the notification process (when the notification is not approved and the medical device cannot be left on the market).

The article attempted to highlight the fact that the new EU legislation will bring down the number of the so-called notified bodies, which are testing centers to control the safety and effectiveness of medical devices. This will mean slowing down the entry of new technologies and limiting the availability of older resources. In the Czech environment, it will be a major obstacle to the implementation of the regulation, the lack of professional capacities - both on the part of the notified persons or producers and on the part of the supervising authority, which is the Institute [10].

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## Management System for Key Knowledge Workers – Initial Assumptions

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**Abstract.** The analysis of the subject literature provides very few ideas for the management of knowledge workers. There is an extensive research gap in the study of methods participation and involvement key knowledge workers in different management processes. There are no proposals for management systems dedicated to the key knowledge workers. The article has a theoretical character referring to previously conducted by the author of the research. The aim of this paper is developed a model of key knowledge workers' management within intelligent organization. These are initial assumptions for the model that need to be developed in subsequent studies. The research was based on survey studies. The survey questions were addressed to entrepreneurs and managers. The study sample consisted of several SME businesses operating in the sector of creative industries in Poland. According to the author of the study more and more mature models of knowledge workers' management are needed. The sector of creative industries is the most developed high-tech sector in Poland with the decisive role of knowledge workers.

**Keywords:** Knowledge Worker, Key Knowledge Worker, Management System.

### 1 Introduction

In the times of a breakthrough we expect from science and scientists to provide responses to many questions and uncertainties. New phenomena occurring in an organization and management require a different perception. New theories and approaches are crystallized. The new categories, for example: economy based on knowledge, knowledge management, knowledge workers (or key knowledge workers) reflect changes occurring in an enterprise which leading resource is represented by people, therefore interpersonal factors and their impact on effective organizational resources implementation constitute the basic research dimension.

Knowledge-Based Economy (KBE) is the economy that is replacing the industrial economy. The "New Economy" is a stepping-stone towards it. The ways of doing business and managing are changing very fast. We can watch paradigm shifts and emerging new paradigms right now. The crucial research problem of the management science is the methods of KWs management within modern economy.

It has become the basic principle in human resources management to pay employees for thinking and not for just time spent on company premises. Creating a model of management knowledge workers, we need to solve many problems. It's necessary to answer such questions, for example:

1. What is the difference between a knowledge worker and a factory worker?
2. What is the difference between managing by forcing and management by encouraging?
3. What is the importance of factors related to human capital in achieving high efficiency of the entire organization functioning?
4. How to show appreciation to KWs?
5. How to encourage transfer and sharing of knowledge?
6. Which characteristics are desirable in the environment of KWs to encourage their creative thinking and operating?
7. How enforce and evaluate the effects of tasks performed when managers are not the experts and don't know of all the consequences of the adopted and approved solutions?
8. How do we should encourage him to extra effort and sacrifices emotionally unrelated to the organization?
9. From what elements: methods, processes, tools should be composed of human capital management system?

In particular: how to develop work environment which functions as the creative thinking and action incentive for the discussed KWs?

I identified issues, processes and challenges primarily focused on the problem of managing knowledge workers in knowledge-based organizations (talent management, motivation for knowledge sharing, the development of competences, work in creative teams and others). These modern plants are often called intelligent organizations (IO). The majority of IO's workers are knowledge workers. Highly gifted people represent the core competencies of the IO [11, 10].

I categorized knowledge workers by distinguishing: promising talents, mature specialists, managers of knowledge management processes and also key workers.

The literature studies I have conducted, focused on the research covering the flow of knowledge in enterprises and my own observations and analyses, as well as numerous interviews with managers allowed me to conclude that the most extensive problem and challenge of its effective stimulation, support and application is the develop of key knowledge workers management system.

Managing key KWs is a difficult challenge. Solutions to empower the best employees are needed. Specific management without management: high level of autonomy, various work hours, motivation referring to the content of work, personal responsibility, opportunities for continuous development and learning. Key KWs must be treated as unique people.

Due to the unique contribution that creates added value in the form of – for example - products or technologies, key KWs have the right to expect special working conditions. Therefore, IO units have to create the adequate working environment for

the specialists. The comfort's zone for them guarantee that key KWs become aware investors of their own intellectual capital.

The article has a theoretical and empirical character referring to previously conducted by the author of the research. The aim of the study is to indicate the elements of the management system of key knowledge workers based on a set of determined features of this group of employees.

The determined features of a key knowledge worker have become the starting point to propose basic elements of the management system of these employees.

## **2 Knowledge Workers and Key Knowledge Workers**

In the 1950s Peter Drucker may have been the first to describe „knowledge workers” and „knowledge work” [5]. Knowledge workers are workers whose main capital is knowledge. Examples include software engineers, doctors, physicians, pharmacists, architects, scientists, lawyers and academics, whose job is to “think for a living” [3]. Davenport defines a knowledge worker as an employee who has a high level of expertise, training or experience and the main purpose of his work involves the creation, distribution and application of knowledge. While Drucker specifying the products of working knowledge worker says that the result of their work are not physical objects, but knowledge and ideas [2]. In turn, Davis and Parker argue that the work based on knowledge is a human mental work performed in order to generate useful information. During this work knowledge workers find information, using the knowledge involved mental models, using concentration and attention [4]. Perhaps the most succinct definition of this category of workers is offered by Abbasi who states that knowledge workers are the ones who add value to an organization based on what they actually know [1]. Davenport sees knowledge workers as people with high degrees of expertise, education, or experience. Knowledge workers think for a living [3]. Mladkova states that knowledge workers represent the special group of highly qualified employees. The specifics of their work and management reflect the intangibility of their major tool and resource, i.e. knowledge-[6].

The author's analysis of subject literature allows concluding that the term “knowledge worker” covers the following characteristic [8]:

1. High expectations regarding the autonomy and empowerment.
2. High competencies and expertise supported by unique knowledge and experience.
3. Versatile skills of creative thinking.
4. Interpersonal, leadership oriented skills.
5. Applying knowledge in its various processes.
6. Involvement in creating new knowledge constituting the basis for innovative processes and solutions.
7. Presenting “tacit” knowledge which offers opportunities for creating added value in an organization.
8. Intellectual, essential and emotional commitment.

9. Waiting for organizational comfort, which provides him/her with extensive independence and opportunities for professional skills advancement.
10. Striving to create an organizational culture based on a high level of professionalism - knowledge, competence, continuous learning and other.
11. Creative thinking is the major part of their activity

Currently, knowledge workers are considered as the most important assets of an organization. The created new business models are people who are very knowledgeable, well that used allows optimal use of the remaining resources of the company, becoming its main assets.

**Table 1.** The most important differences between management by forcing (classic approach) and management by encouraging (an approach based on human capital) [3, 6, 8, 11].

Features	Management by forcing	Management by encouraging
Type of employee	Factory worker	Knowledge worker
Type of work	Mainly physical work: fitting, installation, connection	Mental work: analysing, comparing, consulting, prediction, forecasting, synthesizing, problem solving
Significant effect	Goods; single invention	Ideas; Continual innovation
Key needs of staff	Visible success criteria in career, employment contract for an indefinite period	Long-life learning, autonomy, comfortable working conditions, attractive tasks and projects
Motivation	Competition for individual prizes and bonuses for availability	Cooperation in teams: bonuses for contributions and commitment
Leadership style	Manager-superior	Manager-partner
Management system	Based on hierarchy	Based on partnership in a social network
Internal organizational architecture	Functional areas, e.g.: production, logistics, marketing, R&D, finance	Processes, e.g.: customer service, flow of information, sharing knowledge, staff development, cooperation with suppliers
Work environment	Performing tasks in functional organizational limits	Performing tasks in small often virtual project teams
Essential processes	Production processes	Processes of organizational learning and knowledge management

Productive management of knowledge and others invisible resources requires special approach towards individuals who have the highest level of own intellectual capital. Without them an ongoing inflow of new knowledge, original ideas and innovations would not be possible. Owing to their high qualifications and experience they present knowledge which is unavailable for others.

One of the crucial challenges in Human Capital Management – conceptual and practical – is to encourage key employees to share their knowledge (expertise and experience, skills, good practices, ideas) with co-workers inside the company (see Tab.1).

Key employees are a top class specialist constructing the intellectual and substantive elite. They constitute the group of knowledge workers who have decisive influence on the value of core corporation competencies. They provide unique skills, extensive professional contacts, deep and broad experience. Knowledge which they have acquired is not only advanced, but also an innovative and unique one and therefore it is always of highly individual nature (so-called: *tacit knowledge*). They include specialist, for example: high-class engineers, technologists, programmers, economists and experienced managers.

According to author's findings from recent years, following recommendations are respectively provided in order to improve job factors and increase the occurrence of attitudinal and behavioral variables which may result better management of key KWs:

- Authorization and personal responsibility for employees on some tasks;
- To provide individual appraisals and feedback of personal performance;
- To use flexible work schedule;
- To allow teleworking for some tasks;
- To allocate more budget and time (and more attention, indeed) to research, functional development, collaboration and interaction with scientific societies;
- To implement plans such as job turnover, job enrichment and empowerment of workers;
- To explain mission and vision of organization to workers and to involve them in decision making process.

### **3 Empirical Research and Discussion**

The first research was conducted in the years 2012-2013 and was based on a sample consisting of 50 enterprises. The target group covered enterprises seated in western and south-western Poland. Two research tools were applied in the underlying analyses, i.e.: survey questionnaire addressed to entrepreneurs and managers and an interview questionnaire addressed to key employees. The survey questionnaire applied in the study included 18 questions divided into 3 thematic blocks: company management, key employee profile and key workers involved in the knowledge sharing process. The questions were mostly of closed type ones. An interview consisted of open questions and its purpose was to provoke key employees for presenting deeper reflections and their own, personal opinions [7]. The second research in the period June-July 2015, conducted surveys in 11 selected, private

businesses located in south-western Poland. All questionnaires were filled in by the businesses' owners. The research was based on the questionnaire prepared by the Author, made up of 10 substantives, closed questions with a choice of answers [8].

The conducted empirical studies, in-depth subject literature review and the author's own original considerations and observations resulted in collecting important findings:

- detailed identification of a knowledge worker's profile by analysing the subject literature interpretations of different authors and own experiences resulting from in-depth literature studies, previously conducted empirical research, implementation projects for business practice;
- developing a competency profile of a key employee, who can help and support determining the place, role and effects of professional activity of the discussed employee group;
- determining the structure of duties remaining the responsibility of key employees;
- systematizing the factors influencing the intensification of knowledge sharing processes;
- developing the catalogue of challenges for managing key knowledge workers, specifying potential/actual benefits and risks.

One of the significant results of these two studies was to determine a set of characteristic features of a key knowledge worker defining his/her competences, organizational roles, motivations, etc. (see Tab.2).

**Table 2.** Features of key employees.

Features / categories	Key employee
Substantive competencies	Unique, top quality knowledge based on many years of experience and master skills
Other valuable competencies	Leadership skills, extensive contacts in the sector (with suppliers, clients, scientists, investors), innovative approach, mentoring skills
Intellectual potential	Unique
Substitution for a leaving employee	Practically impossible, requires the introduction of long-lasting programmes for the succession of posts and trainings of successors



Organizational roles: performed in the same time or different time	<ul style="list-style-type: none"> <li>• top level manager</li> <li>• management representative</li> <li>• innovator and the author of patents</li> <li>• coordinator and leader of many projects</li> <li>• mentor</li> <li>• internal trainer</li> <li>• supervisor of newly admitted employees</li> </ul>
Incentives	<ul style="list-style-type: none"> <li>• individually agreed salary</li> <li>• extensive financial means for trainings</li> <li>• contracts for participation in company profits</li> <li>• comfortable work conditions adjusted to individual preferences</li> <li>• flexible working hours</li> <li>• autonomy on the workplace</li> </ul>
Accomplished career level	<ul style="list-style-type: none"> <li>• professional comprehensive qualifications</li> <li>• authority of knowledge</li> <li>• recognition and fame outside the company</li> </ul>
Fundamental work results	<ul style="list-style-type: none"> <li>• initiating changes based on creative thinking</li> <li>• implementation of systemic management concepts</li> <li>• establishment of new products generations</li> </ul>

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The conclusions resulting from the carried-out research allowed formulating the proposals for basic guidelines related to the construction of a comprehensive knowledge workers' management system, which may become useful for enterprises and their managers. These guidelines relate to e.g. the needs for identifying the core values of an enterprise, defining its mission, vision and strategic goals, developing the key competences of an intelligent organization, attracting and identifying key knowledge employees, developing the personnel strategy for knowledge workers. The listed guidelines for the development of a comprehensive key employee management system indicate the directions of crucial strategic choices. In the system of a specific enterprise/organization – while maintaining the above-mentioned fundamental principles – the time priorities of particularly valuable (important) issues, areas, challenges and processes for the company should be defined.

The key KWs expect organizational comfort which provide him/her with extensive independence and opportunities for professional skills advancement. They also value

organizational culture in which competencies and knowledge are respected and have impact on the entire company personnel attitudes and behavior.

#### **4 The Comprehensive Key Employees Management System - Author's Assumptions**

The results of the previous study [7, 9] were used to develop a model of intelligent organization used in CI companies (see in Fig. 1.) In the light of the research conducted by the author it seems appropriate to recommend the following factors for providing effective business model in CI [9]:

- Culture of Knowledge Sharing (CKS);
- Knowledge Workers Management (KWM);
- Team Organizational Forms (TOF);
- Advanced Production Technology & Communication (APT&C).

*The business model in CI* is an original author's version of the concept of the intelligent organization which has the following attributes:

- organization gathers knowledge potential,
- constructing strategic advantage based on unique competencies,
- dynamic continuous changes,
- moving from functions to processes,
- abandoning hierarchy for relations,
- making team work common,
- capturing and keeping workers with high intellectual potential,
- open communication supported by IT, ICT.

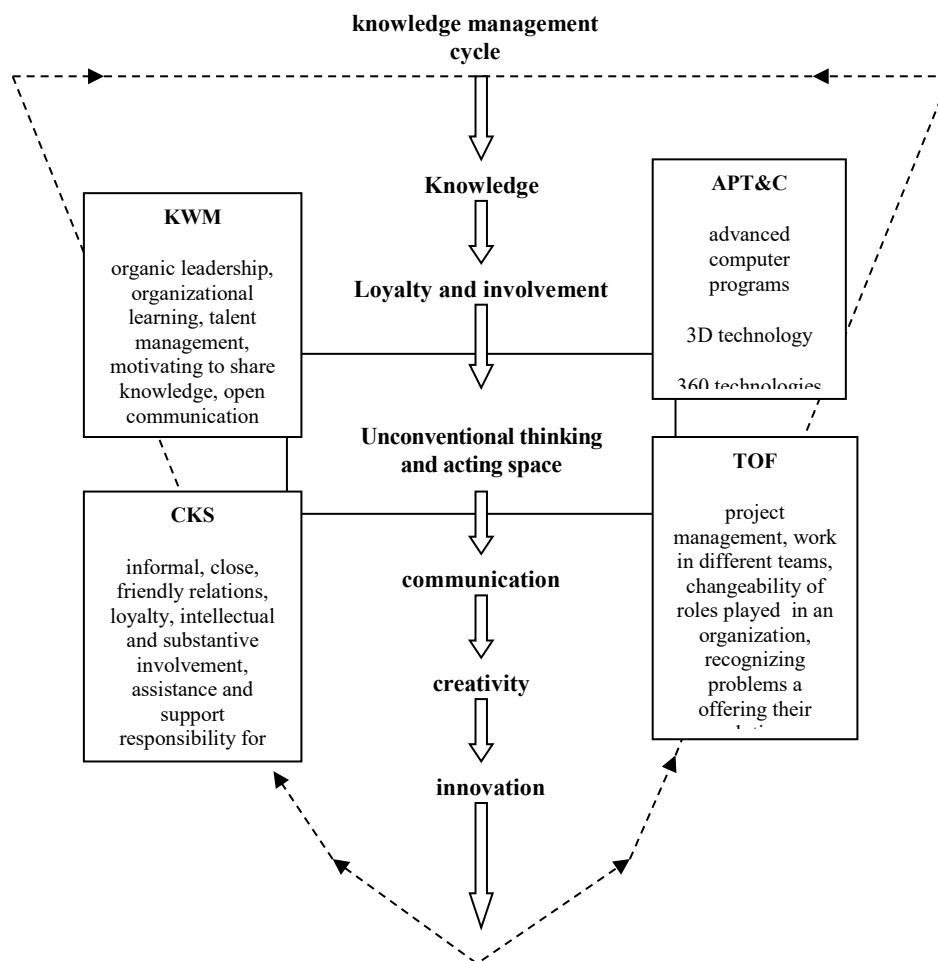
This model will be permanently expanded with the next essential elements in the intelligent organization. It should to be suspected particularly intensive conception research in the range of knowledge workers management and organization solutions.

Particular solutions referring to key employees can follow the suggestions presented below [8]:

1. Career based on work positions rotation, changing organizational roles, performing different, changing in time and scope functions for an organization, taking part in different projects.
2. Promotion depending on sharing one's own experiences with others: playing the role of an internal coach, mentor, trainings, seminars and conferences organizer.
3. Social competencies development by organizing knowledge sharing places: workshops for particular departments, meetings with new employees, inviting key and less experienced employees to work together in the same team.
4. Organizational culture creation based on the sense of creating cooperating community underlying collective responsibility principles: organizing events

for particular occasions gatherings of all company employees, joint celebrations of both the company and individual employees success, motivation oriented business trips, meetings with families, etc.

5. Company environment monitoring by means of formal relations (personal consultancy agencies, universities, research and development institutes) and informal ones (distinctive scientists, patent authors, inventors, professional experts) in order to attract the best candidates from the environment.



**Fig.1.** Model of intelligent organization used in Creative Industries.

## 5 Conclusions

Without key employees' satisfaction it is hard to establish an effective management system in an enterprise. Thus, however is not an easy problem to solve. Similar, or

even higher salary may be offered to them in another company. In the author's opinion it is indispensable to create the concept of an adequate work environment for this particular group of employees. In the discussed model-oriented perspective financial incentives are key employees expects organizational comfort which provides him/her with extensive independence and opportunities for professional skills advancement. A key employee also values organizational culture in which competencies and knowledge are respected.

When the intellect becomes a critical production factor, the successful enterprises differ from the less effective ones predominantly in their approach towards employees. Managing knowledge workers in an enterprise within the CI sector should not take the form of a closed project with ultimately outlined goals. The effects to be expected are continuous and essentially timeless, such as the development of good practices or the intensification of learning processes.

It is necessary to continue the research in the area of knowledge workers' management in creative industries. The following research areas seem particularly interesting:

- Comfort and relaxation as the factors stimulating creative thinking vs. rigid formal and legal requirements: working time, scope of duties;
- Difficulties in reconciling diverse preferences of the successive generations of workers, primarily between the youngest "Z" generation representatives and the other ones;
- Encouragement for knowledge sharing between the key workers and the newly employed ones.

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## Development of Production in the Food Industry in Poland in 2000-2016

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**Abstract.** In 2000-2016, the sold production of the food industry (including tobacco) increased more than two times in current prices (from PLN 92.8 to 220.3 billion), i.e. it was growing at a rate of 5.6% per annum, and in constant prices increased 78.7%, i.e. it was growing 3.7% per annum. Development of individual directions of food processing indicates that in the analysed period production for non-food purposes, i.e. production of feed and pet food, esters, dehydrated and methylated spirits, was developing the fastest (nearly threefold increase in the value of production). Secondary processing of food, which includes, *inter alia*, the production of canned food, dishes, prepared meals, desserts, snacks and non-alcoholic beverages, was also developing quickly (more than twofold increase). Initial processing, i.e.: slaughter of animals, milk processing, milling of cereals (by approx. 93%) and production of stimulants (by approx. 54%) was developing more slowly, and the most slowly proper processing, e.g.: production of cured meat, milk, butter, cheese, bread (by 28%). Food export became the main factor in the production growth in the food industry in Poland which in 2000-2016 managed about 62% of its growth. Changes in producer prices and domestic demand were factors which created development of production in the food industry to a smaller extent, and in some years inhibited it. Increase in the producer prices contributed approx. 30% to the production growth, and domestic demand 8%.

**Keywords:** Food Industry, Production, Export, Consumption, Prices.

### 1 Introduction

Food industry is one of the main links (elements) of the food economy. It is the largest recipient of unprocessed agricultural raw materials, and at the same time the largest supplier of food to the sphere of trade (wholesale and retail) [4, 6]. Food industry performs many functions as in economic terms it contributes to the country's GDP, affects trade, and in socio-economic terms provides jobs, creates changes in agricultural production, meets consumers' tastes and expectations, mitigates rapid increases in purchase prices of agricultural products, ensures food safety for consumers, as a food producer and the entity responsible for the product placed on the market [6].

The food market is constantly changing (evolving) which to some extent is creating the food industry, but also adapting to these changes, hence the development of this branch of the processing industry is conditioned by many factors [1, 3, 4]. In 2016, the share of the food industry (including the production of foodstuffs, beverages and tobacco products) in the creation of Poland's gross domestic product amounted to 3.1%, and about 417 thousand people were employed in it [9].

## **2 Methods and Sources of Materials**

The objective of this study was to show development of sold production of the food industry in Poland in 2000-2016 compared to economic development of the country, agricultural commodity production, the entire processing industry, food consumption, food export and import. The analysis of the varying rates of development of the basic directions of the food industry processing was carried out. Factors determining development of production in the food industry and their significance were indicated. The focus was on the analysis of development of the food industry in relation to changes in the production volume, without taking into account the quality changes of the food produced.

This paper is a comparative analysis in which secondary source materials were used. The relevant indicators were used to determine changes over time. The study mainly used published and unpublished data of the Statistics Poland, the Analytical Centre of the Customs Administration (CAAC), the Ministry of Finance (MF) and publications referring to the broadly understood food economy.

## **3 Development of Production in the Food Industry**

In the period preceding Poland's accession to the European Union (2000-2002), the rate of development of the food industry (including tobacco) was small – at 2.1% per annum (calculated in constant prices) and it was several times slower than in the second half of the 1990s. Another production revival in the food industry started immediately prior to Poland's accession to the EU (Table 1). In 2003, the production of this sector increased 7.6%, and in 2004-2007 on average 7.3% annually. In the following years, the dynamics of the sector's development weakened, which was undoubtedly related to the global financial and economic crisis (2007-2008). In 2008, the production of the food industry in Poland (in constant prices) was at the level of the previous year, and in the next three years, it was growing at the rate of 3.3% annually, to accelerate to 6.1% in 2012. In 2013-2015, the growth dynamics of production in the food industry decreased to 2.6% per annum, and in 2016 accelerated to 5.3% (Table 1).

**Table 1.** Comparison of the pace of development of production in the food industry and its market environment (in per cent) [8,10,11,12].

Year	Increase in sold production of the food industry (including tobacco) compared to the previous year <sup>a</sup>	Dynamics compared to 2000							
		global production of agriculture <sup>a</sup>	marketable production of agriculture <sup>a</sup>	GDP <sup>a</sup>	industrial production <sup>a</sup>	production of the food industry (including tobacco) <sup>a</sup>	Consumption of food, beverages and tobacco products <sup>a,b</sup>	export of products of the food industry <sup>c</sup>	import of products of the food industry <sup>c</sup>
2001	4.5	5.8	2.9	1.2	0.6	4.5	0.9	17.0	10.1
2002	-0.2	3.8	7.2	2.6	1.7	4.3	2.4	17.4	9.3
2003	7.6	3.0	12.8	6.6	10.1	12.2	3.5	34.7	6.6
2004	4.0	10.7	16.5	12.3	24.0	16.7	6.4	75.0	32.5
2005	2.5	5.9	11.2	16.3	28.6	19.6	8.2	140.7	71.1
2006	6.6	4.7	15.8	23.5	43.5	27.5	12.1	195.5	105.3
2007	6.7	10.8	17.6	31.9	58.9	36.0	14.7	245.4	149.6
2008	0.0	14.4	24.7	38.7	64.6	36.0	17.4	293.6	210.2
2009	3.8	17.1	28.6	47.1	57.2	41.3	18.9	284.2	203.7
2010	2.9	13.9	26.5	52.4	72.8	45.4	18.8	360.2	249.6
2011	3.7	16.4	31.3	60.0	87.8	50.8	18.0	410.6	284.8
2012	6.1	15.4	32.9	62.6	89.1	60.0	14.8	464.4	307.3
2013	0.8	19.3	39.1	64.9	92.7	61.3	13.1	527.6	323.3
2014	1.0	25.8	42.0	70.3	103.3	62.9	8.9	568.8	342.4
2015	4.2	20.9	41.0	76.8	117.3	69.7	7.6	619.4	364.7
2016	5.3	29.5	49.0	81.9	126.0	78.7	11.7	644.8	364.7

<sup>a</sup> in constant prices, <sup>b</sup> in households in accounting terms, <sup>c</sup> in value in EUR without conversion into PLN



Due to the comparative advantages of the Polish food industry (lower labour costs, cheaper raw material, lower sale prices) and high quality of produced food in the conditions of deteriorating macroeconomic situation and the economic majority of societies in the EU-28 countries, the sector managed well and used the situation (recession followed by a slow return to the path of economic growth of the European Union countries), increasing food exports, which was an impulse for further rapid development in the following years [7]. Another feature of recent years was large volatility (turbulence) in the prices of agricultural raw materials in global markets. In 2011-2013, the FAO food price index was more than twice as high as in 2002-2004 and on average amounted to 218%, to decrease to about 163% in 2015-2016 [13].

Between 2000 and 2016, the rate of development of the food industry in Poland (including tobacco) measured by the value of sold production (in constant prices) amounted to 4.0% per annum. The development dynamics of this industry sector was lower than of the entire Polish industry (5.2% a year) and slightly slower than the growth rate of gross domestic product (3.8%). Sold production of the food industry (in constant prices) was increasing almost two and a half times faster than the global production of agriculture (1.6%) and 50% faster than the marketable agricultural production (2.5%) and five times faster than the consumption of food, beverages and tobacco in households (0.7% per year). In final years, consumption of food and stimulants was decreasing (in constant prices), and their share in total expenditure by household decreased from 27.1% in 2010 to 22.5% in 2016 [7].

In the analysed period, the growth rate of export of food industry products was the fastest (more than eight times faster than that of production of the food industry) and import of these products, which increased about 10% annually, was slower.

In sixteen years, as a result of such changes both in the food industry and in its environment, there was an increase in the production of food, beverages and tobacco of 78.7%, with the increase of production of the whole industry of 126.0%. Growth of production in the food industry in the analysed period was slightly lower than the increase in gross domestic product (by 81.9%). At the same time, it was definitely larger than that of the marketable agricultural production (49.0%) and the consumption of food, beverages and tobacco products (11.7%). Therefore, it can be concluded that the food industry strengthened its position in the food sector and increased its share in satisfying the demand for food. However, its position in the entire Polish industry and economy is weakening, which is associated with a change in consumption patterns and a decreasing share of food in the expenses and incomes of the population.

In the 1990s, the basis for development of the food industry was a rapid increase in the uptake of the domestic market [2]. After Poland's accession to the European Union, development of demand for food, beverages and tobacco products declined, and in some years this factor inhibited the growth of food production as domestic demand was decreasing (Tables 2, 3). The situation was similar in the case of producer prices as in the analysed period they were increasing but also decreasing. In 2011-2012, thus the period of high prices of agricultural raw materials on global markets, the increase in producer prices had the greatest impact on the increase in the value of sold production of the food industry.

**Table 2.** Impact of export, producer prices and domestic demand on the increase in production of the food industry in Poland (year/year) (in current prices) [8, 10, 11].

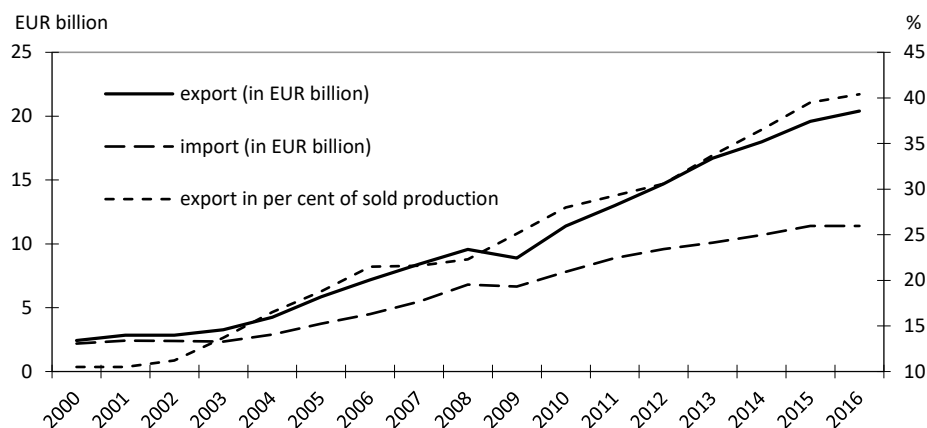
Detailed list	2001	2002	2003	2004	2005	2006	2007	2008
Value of production in the food industry (including tobacco) (in PLN billion)	100.0	98.5	105.0	116.8	125.2	131.9	147.5	149.7
Increase in the production of the food industry (year/year) (in PLN billion), including:								
change in the main components (in PLN billion), i.e.								
• export	+0.7	+0.5	+3.5	+4.9	+4.2	+4.5	+3.7	+1.9
• producer prices	+3.2	-1.3	-1.0	+8.0	-1.5	-1.5	+6.9	+2.4
• domestic demand	+3.3	-0.7	+4.0	-1.1	+5.7	+3.7	+5.0	-2.1

**Table 3.** Impact of export, producer prices and domestic demand on the increase in production of the food industry in Poland (year/year) (in current prices) [8, 10, 11].

Detailed list	2009	2010	2011	2012	2013	2014	2015	2016
Value of production in the food industry (including tobacco) (in PLN billion)	158.1	162.3	182.7	201.9	206.0	204.4	207.5	220.3
Increase in the production of the food industry (year/year) (in PLN billion), including:								
change in the main components (in PLN billion), i.e.								
• export	+4.9	+7.0	+8.1	+8.0	+8.6	+5.3	+6.5	+7.0
• producer prices	+2.9	+0.5	+15.7	+8.5	+2.5	-3.5	-5.4	+1.8
• domestic demand	+0.6	-3.3	-3.4	+2.7	-7.0	-3.4	+2.0	+4.0

A large increase in producer prices occurred also earlier, i.e. in 2004 and 2007. In 2000-2016, the value of sold production of the food industry (in current prices) increased PLN 127.5 billion, of which 62% was the result of an increase in the export of food products, 30% resulted from the increase in producer prices, and 8% from internal demand (Tables 2, 3). This means that without development of food export,

which was the effect of Poland's integration with the European Union, the increase in the sector's production would be more than half lower.



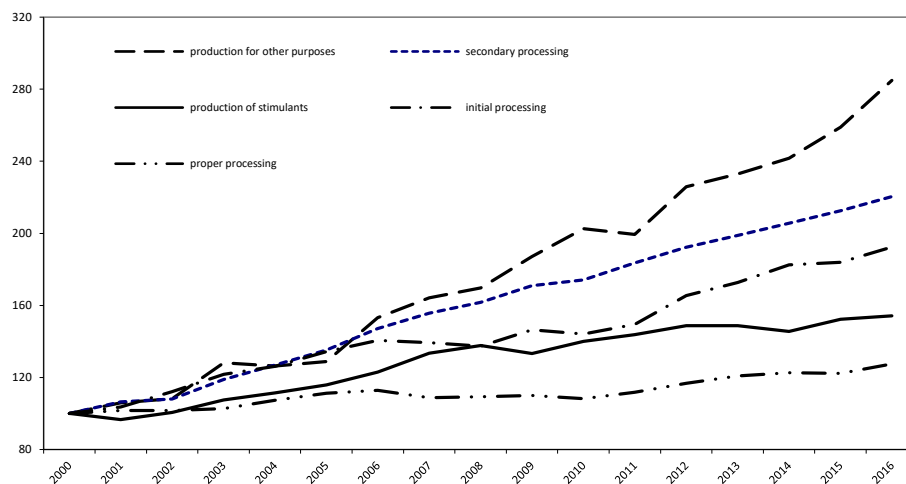
**Fig. 1.** Development of foreign trade in food industry products [2, 10, 11].

In the analysed period, the share of export of food industry products increased from 10.5% to 40.4% of the sold production of this sector (Fig. 1). The increasing share of food export indicates an important role of this factor in the use of surplus production of the food industry, and thus in its development (see Tables 2, 3). Export was not only an important sales channel for products of the domestic food industry, but also stimulated the economic situation in many industries and contributed to the improvement of the economic and financial performance of the food industry. The balance of trade in products of the food industry increased from EUR 0.24 billion in 2000 to EUR 9.0 billion in 2016.

#### 4 Development of Individual Directions of Food Processing

Another important factor in development of the food industry in the analysed period was the constantly growing demand for highly processed food as well as development of industries which produce for the needs of other sectors of the economy. The production of these products (i.e. feed for livestock, pet food, dehydrated and methylated spirits, esters, glucose and isoglucose) increased 6.8% per year. The value of this production (in constant prices) in 2016 was almost three times higher than in 2000 (Fig. 2).

The secondary processing of food, which includes the production of canned food, dishes, prepared meals and other multi-ingredient products as well as various types of snacks, desserts and non-alcoholic beverages, was also developing quickly. Its growth rate amounted to 5.1% per annum and was higher than that of the entire food industry. The production of highly processed food in 2000-2016 increased 220%.



**Fig. 2.** Dynamics of development of the main directions of industrial processing of agri-food products (2000 = 100) [12].

A large increase in production was also achieved in the so-called initial processing of agricultural products (i.e. industrial slaughter, processing of milk, rapeseed, sugar beet, fruit and vegetables, milling of cereals for food and feed and their industrial use). The value of initial processing in 2000-2016 increased almost two times, and its average annual growth rate was slightly faster than that of the entire food industry and amounted to 4.2%. Between 2005 and 2011, there was a slowdown and even stagnation of this direction of processing. Since 2011, its dynamics clearly accelerated.

In 2000-2016, the value of the production of stimulants increased about 54%, i.e. at a rate of 2.7% per year, so it was developing a bit slower than that of the entire food industry. A new phenomenon after the integration with the EU was the acceleration of development of production of spirit drinks and tobacco products, with a significant reduction in the production of the wine sector (more than 2/3). After the rapid development of production of stimulants in the first half of the last decade, there has been a marked reduction in its dynamics since 2007. J. Drożdż explains these changes with the fact that demand for these items is more flexible than for the main food products (this is not a basic good). Production of beer and cigarettes had a steady upward trend in the analysed period in terms of volume [2].

The production of standard food products, the so-called proper processing, was developing the most slowly. In 2000-2016, the production value of this processing direction in constant prices increased only 27.5%, and the average annual growth rate amounted to 1.5%. It was the largest (about 4%) in the first years after integration (2004-2005) and in the last years of the analysed period (2010-2016), when the growth rate amounted to 2.8% per annum. In 2007-2010, there was stagnation and even a slight decrease in this processing (similarly to the initial processing).

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## 4 Conclusions

In 2000-2016, the sold production of the food industry in Poland increased more than two times from PLN 92.8 to 220.3 billion, i.e. it was growing at a rate of 5.6% a year, and in constant prices increased 82.8%, i.e. it was growing 3.8% a year. Poland's accession to the European Union in 2004 became an impulse for faster development of this sector.

In the analysed period, the driving force of production in the food industry in Poland was food export, which managed about 62% of the production growth in this sector. The share of the other two factors, i.e. the increase in producer prices and internal demand, was lower and contributed 30% and 8% to growth, while in some years they hindered this growth.

In 2000-2016, development of individual directions of food processing was very diverse because:

- production for non-food purposes, i.e. production of feed and pet food, esters, dehydrated and methylated spirits, was developing the fastest (nearly threefold increase in the value of production),
- secondary processing of food, which includes the production of canned food, dishes, prepared meals, desserts, snacks and non-alcoholic beverages, was also developing quickly (more than twofold increase),
- initial processing, i.e.: slaughter of animals, milk processing, milling of cereals, was developing more slowly (by approx. 93%),
- production of stimulants increased about 54%,
- proper processing, e.g. production of cured meat, milk, butter, cheeses and bread, was growing the most slowly (by 28%).

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## Analysis of Social Media as a new Administration and Communication Tool - Case Study of Czech Universities

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**Abstract.** In this paper, we take a deeper look at the presence of universities in the social media environment. We perform a comprehensive analysis of both public (28) and private (39) universities from the Czech Republic – look into statistical data of two years of Facebook usage, such as posting activity and its relation to number of students. Paper investigates whether the number of students and number of fans on Facebook page makes a difference in social media performance. Looks for the correlation between the metrics such as number of posts or engagement rates and the size of audience. We also check, whether the internationality of universities affects their social media behavior by comparing number of foreign fans which are former, current or prospective international students. Lastly, we summarize the type of content published by different universities. Since popularity of content types on social is evolving with new technologies, we looked for factual proofs of different level of engagements in text and visual contents. The paper concludes, that Facebook has become standard communication tool among Czech universities, especially the public ones.

**Keywords:** Czech Universities, Social Media Presence, Analysis, Modern Trends in Administration.

### Introduction

Universities have always been pioneers in changing the standards of the world and societies and they have to adapt to new communication standards after their students already adapted themselves [5]. Especially, after generation of so-called “digital natives” took their places in university classrooms, active presence in social media became inevitable. [2, 3, 6, 7]

In this paper, we will take a deeper look at the presence of universities (both public and private) in social media environment – Facebook in particular. Facebook pages are a simple way for universities and their departments to connect with students, academic staff and public locally and internationally. Academic and social successes of universities are shown in Facebook posts, announcements are published and important events shared. We will look into statistical facts about usage of Facebook pages by universities such as posting activity and its relation to number of students. Secondly,

we will investigate whether the number of students and number of fans on Facebook page makes a difference in social media performance. We will try to find a correlation between the metrics such as number of posts or engagement rates and the size of audience.

The third biggest consideration of this paper is whether the internationality of universities affects their social media behavior. We will compare the metrics regarding number of foreign fans which are former, current or prospective international students [9].

As a fourth point of view, we will take the type of content into consideration. Since popularity of content types on social is evolving with new technologies, we will search for factual proofs of different level of engagements in text and visual contents.

## Methodology

According to the latest report Facebook [1] has the largest number of active users among existing social media networks – as of the third quarter of 2018, Facebook had 2.27 billion monthly active users. Because of its audience size, Facebook is bound to cover the largest percentage of university audience. Facebook is also one of the most useful platforms for university propagation, because of its feature called Pages, which are perfectly suited for the task (as opposed for example to videos on Youtube or photos on Instagram). Our main source of data were Facebook pages. We used Netvizz web application [8] and collected following data for each page (for the two year period from Oct 1<sup>st</sup> 2015 to Sep 30<sup>th</sup> 2017):

- posts (date of publishing, type, etc.); number of comments;
- user engagement for posts (likes, shares, comments, reactions); number of fans.
- student numbers come from reports published on websites of each faculty.

Following universities were analyzed:

**Public universities:** Charles University (CUNI), Czech Technical University (CTU), Czech University Of Life Sciences Prague (CULS), Masaryk University (MUNI), Palacky University Olomouc (UPOL), University of Western Bohemia (UWB), University of Chemistry and Technology (UCT), University of Economics, Prague (VSE), Brno University of Technology (VUT).

**Private universities:** University of New York Prague (UNYP), The University of Finance and Administration (VSFS), Unicorn College (Unicorn), SKODA AUTO University (SAVS), Anglo-American University (AAU), The Institute of Hospitality Management in Prague (VSH), Metropolitan University Prague (MUP), College of International And Public Relations Prague (VSMVV), Vysoka Skola Obchodni (VSO), Bankovni Institut Vysoka Skola (BIVS), College of Entrepreneurship and Law (VSPP), Sting Academy (Sting)



## Used tools

We aimed to automatize all labor intensive tasks such as data extraction, aggregation and calculations across all tables. For that we used software Knime Analytics Platform and Python scripting language. For other tasks we used Microsoft Excel.

## Metrics

This section describes different metrics that we choose to answer following questions:

- What is the presence of different universities on different online platforms? How active are universities on Facebook?
- What types of posts are most popular?
- How engaged are fans of different Facebook pages in terms of comments?
- How responsive are page administrators?
- Is there a difference between private and public universities in posting and comment activity?

## Usage of Online Platforms

According to information from MSMT [4], there are 67 institutions of higher education in Czech Republic. Of those, 26 are public, two are state higher education institutions (The Police Academy and University of Defense). Remaining 39 are in private ownership. The number of representatives of non-university tertiary educational sector are larger than universities - 39 versus 28. For convenience, all educational institutions are hereafter referred to as 'university' regardless of this division. All universities in Czech Republic, all their faculties, even most departments have official web. All web pages of Czech universities have an English version, some of them additionally provide information in other languages, for example in German, Russian or Chinese.

The question of this paper is how social media is used by Czech universities: what goals are pursued, what platforms are used mostly and how active on Internet are higher educational institutions of this country.

It must be noted that we considered only social accounts on social media (either linked from the official website or verified). Shown below is a summary - total number of educational number and percentages of usage for each social platform.

**Table 1.** Summary of social platform usage for all educational units.

	Facebook	Instagram	Twitter	Youtube	Google+	LinkedIn
Total	91	32	31	58	14	19
Percentage	93.91	32.99	31.96	59.79	14.43	19.59

It has been proven, that Facebook is by far the most used platform among the Czech educational institutions.

### Average posting and commenting activity per month

This metric shows activity on Facebook for each university. Activity is defined by average number of posts and comments per month. For each university, posts and comments from each Facebook page related to the university (e.g. main Facebook page and pages for each department, if available) are aggregated. A mean number of posts per month is then calculated, for the observed period. Universities are divided into two groups, public and private. Post and commenting activity is compared within both groups.

**Table 2.** Public and private universities ordered by post activity and comments.

University	Avg. number of posts per month	University	Avg. number of comments per month
CUNI	431.29	MU	390.54
MUNI	294.08	CUNI	263.41
CTU	286.37	VUT	220.62
UPOL	268.58	UPOL	147.91
VUT	205.37	CTU	133.91
UWB	129.54	UCT	68.62
VSE	100.04	CULS	52.87
CULS	98.87	VSE	50.25
UCT	79.79	UWB	40.71

**Table 3.** Private universities ordered by post activity and comments.

University	Avg. number of posts per month	University	Avg. number of comments per month
MUP	27.16	UNYP	14.58
UNYP	24.16	VSFS	6.58
VSMVV	17.25	Unicorn	6.58
VSFS	15.66	SAVS	5.50
AAU	15.50	AAU	5.21
VSO	15.45	VSH	4.42
SAVS	15.12	MUP	4.04
VSH	12.70	VSMVV	3.29
Unicorn	9.79	VSO	3.00
VSPP	8.50	BIVS	2.04
BIVS	7.04	VSPP	1.50
Sting	4.13	Sting	1.00

Then, mean posting and commenting activity is calculated and both groups are compared.

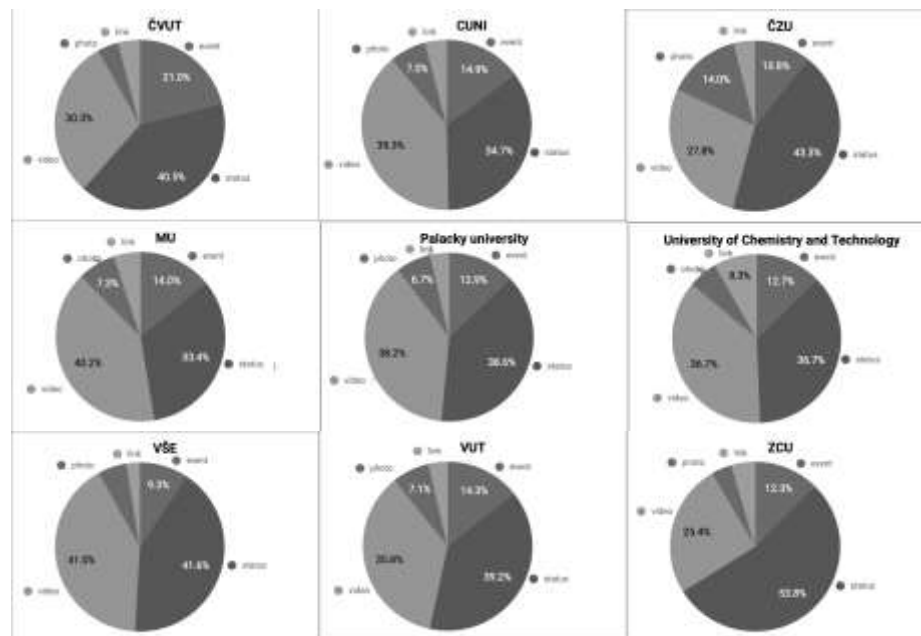
**Table 4.** Mean posting and commenting activity.

	Post - Public	Post - Private	Comment - Public	Comment - Private
Average	210.439	14.376	152.10	4.81

Table 4 shows, that public universities have higher absolute both posting and commenting activity on Facebook.

### Usage of different types of posts

This metric shows, what types of posts do universities use most often. Status, Photo and Video are most popular types, but variation between universities is great.



**Fig. 1.** Breakdown by post type (event, status, video, photo, link) for public universities.

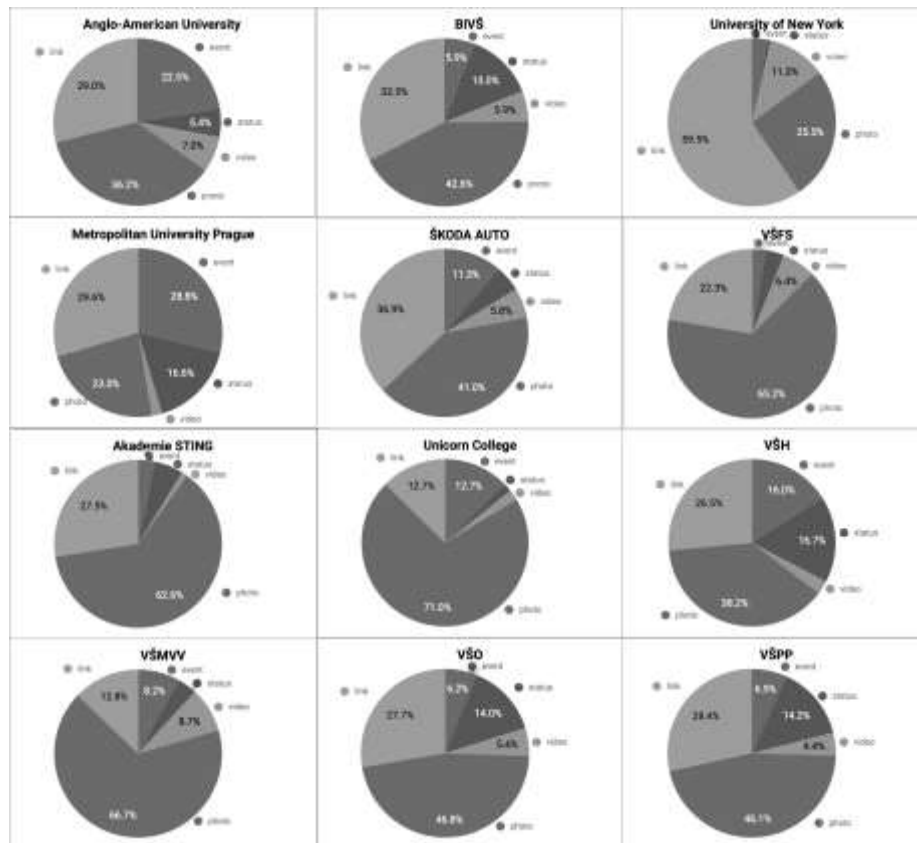


Fig. 2. Breakdown by post type (event, status, video, photo, link) for private universities.

### Correlation between number of students and posting activity

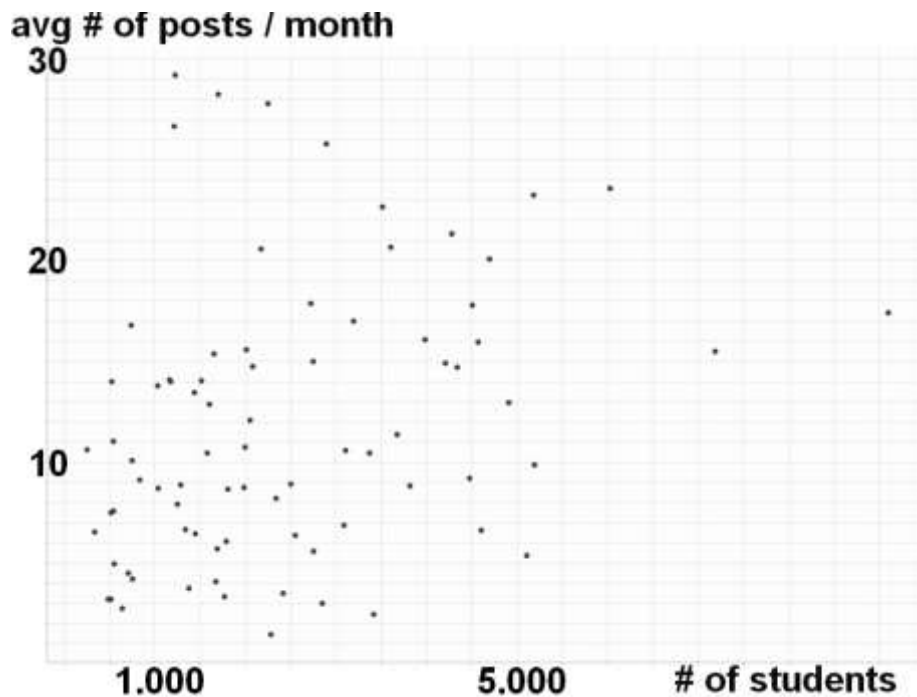
There is a significant difference between average number of students for private and public universities. In 2016, mean number of students in public universities was 20.686, whereas in private universities mean number of students was 1.490. This metric shows, whether there is a relationship between number of students and posting activity.

Pearson correlation coefficient is calculated for number of students and total number of posts in 2016 for each university.

Table 5. Private universities ordered by post activity and comments.

	# of students	Avg. # of posts per month
# of students	1	0.3
Avg. # of posts per month	0.3	1

Poor linear correlation does not prove, that there is no other type of correlation. Figure 3 shows a scatter plot of number of students and number of posts. Subjective analysis shows no apparent relationships (such as clusters) between the two variables.



**Fig. 3.** Scatter plot of relation between number of students and average number of posts.

### **Number of foreign fans and students**

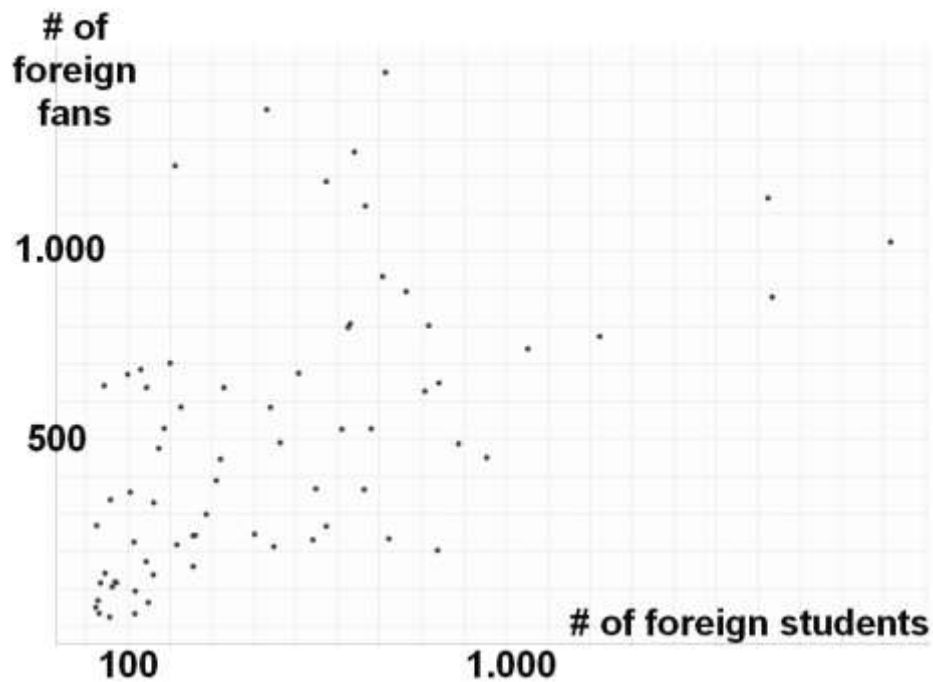
This metric is a measure of how international different universities are in terms of foreign fans. When we compare number of students and numbers of foreign fans of Facebook pages, we can see, that percentage of foreign students for public universities is no more than 21%. At the same time, private universities have significantly higher numbers of foreign students: as high as 77%. This can be caused by the fact, that some private universities have less Czech language programs. But we can see it only with private universities. As we can see, most of public universities has more foreign fans than actual students. That's also a good sign, they are still interested in activities at universities (most of them are post-graduated or planning to join university).

### Correlation between number of foreign students and number of foreign fans

This metric shows relationship between number of foreign students for each department and number of foreign fans of the related Facebook pages (where available). Pearson correlation coefficient is calculated separately for private and public universities.

**Table 6.** Correlation measure between number of foreign students and foreign fans for public and private universities (excluding outlier).

	# of foreign stu (public uni)	# of foreign fans (public uni)	# foreign stud. (private uni)	# of foreign fans (private uni)
# of foreign students	1	0.54	1	0.217
# of foreign fans	0.54	1	0.217	1



**Fig. 4.** Scatter plot of number of foreign students and fans for public universities.

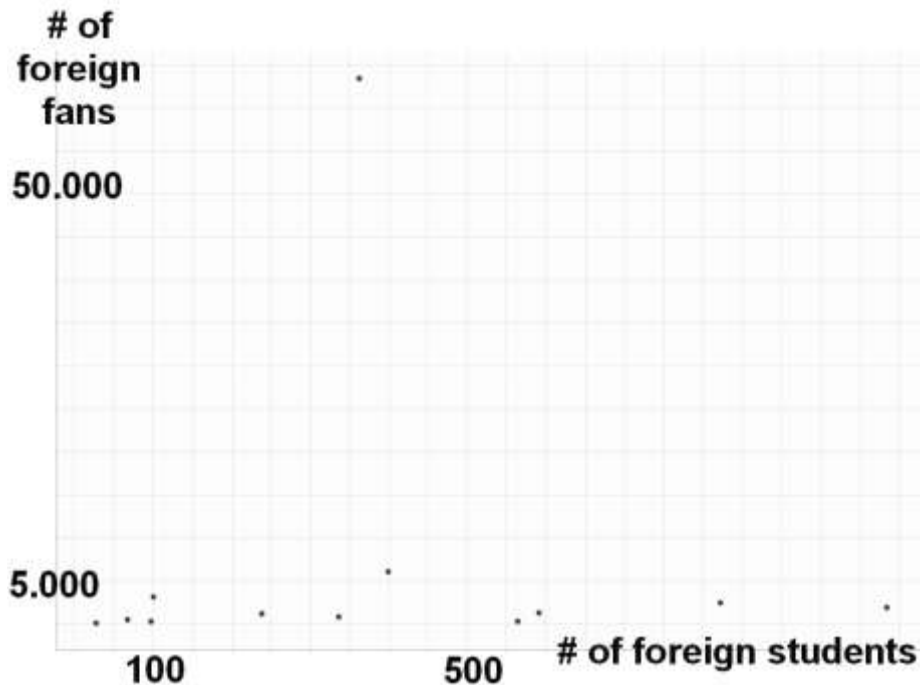


Fig. 5. Scatter plot of number of foreign students and fans for private universities.

### Feedback test

To evaluate, how active universities are in communication, the following experiment was taken: 5 simple questions were sent to page administrators via direct message from different accounts regarding:

- deadline for sending applications; cost of application;
- deadline for submitting nostrification of foreign diploma;
- whether it is possible to download samples of entrance tests and where to find them;
- minimal score to be accepted.

The matter of our experiment was not semantics of responses, but structural elements and language as well as response time. Response quality was judged by these criteria:

- greetings;
- addressing by name;
- completeness of the answer; direct link;
- emoji; farewell;
- signature; wishes.

Out of 60 questions sent to private universities, only 20 were answered, whereas 276 of 280 of questions sent to public universities were answered.

Then maximal, minimal and average speeds of answering for each day were calculated. The most active day, when the waiting time is minimal is Tuesday, the minimal speed was detected on Thursday. The same calculation were made for universities - before-mentioned parameters for each university, both private and public. The fastest public university was UCT, among private VSMVV is the best one.

Quantitatively private university are worse, because most of them didn't reply, but in qualitative characteristics private universities made a better impression creating friendly atmosphere. While in public universities some administrators give a recommendation to ask in student's office either as a response or even automatic response, private universities even asked us questions to assure that they understand correctly. However, the most detailed answers came from public university CTU.

## Conclusion

In this paper, we took a deeper look at the presence of universities in social media environment. To do a comprehensive analysis, we chose the most popular social media platform both for students, academic personal and universities in Central Europe region. According to our research the most popular online platform, that public and private universities in Czech Republic are using, is Facebook. That's their main tool to provide the information and to communicate with students. Second place goes for the Youtube and percentage is slightly less than 60%. It is important to note, that these two platforms serve a different purpose. While Facebook is a social platform, Youtube is primarily a video sharing platform.

An average amount of posts by public university is 210, when for private that's only 14. The same with comment activity on pages - average amount of comments for public is again 210, when for private it's less than 5. Those are absolute numbers. One reason for this disparity might be number of students, although posting activity is not strongly correlated with this variable. We have shown, that size of the audience doesn't affect activity of universities on Facebook.

As for foreign fans and foreign students: those are poorly correlated for private universities and moderately correlated for public universities. Public universities are also much better at responding to user questions, but private universities provide better quality responses.

In general, our experiment proved that Facebook has become standard communication tool among Czech universities, especially the public ones.

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## **Influence of the Entrepreneurial Environment upon Availability of Real Investments**

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**Abstract.** While evaluating investments, as a rule, first of all, investing criteria, which include yield, risk and liquidity, are being assessed. This step is usually performed by most of beginning and unprofessional investors. The goal of the paper is to draw attention the criterion which it is necessary to take into consideration while making decision about investment intentions as first, and – by this – to describe a method of its assessment. It comes from economic conditions, where each investor has a limited quantity of financial resources which is a limiting factor for him/her. The main problem is that a series of beginning investors is excited by whatever financial product and considers its future purchasing just to discover – after a certain period of time – that only part of solvent investors, who has a sufficient initial financial capital, is able to enter this field of investments. The benefit is that there are such investment products in the entrepreneurial environment the conditions of which can be adjusted so that they were maximally available for the general public. On the contrary, some other investments, however, precisely define a quantity and the minimal amounts which are to be at the investor's disposal by the date of investment realization.

**Keywords:** Availability, Real Investment, Entrepreneurial Environment.

### **1 Introduction**

Everyone who has made decision to carry out investment intentions should have a sufficiency of his/her own financial resources of which he/she is ready to give up at a certain moment with the expectation that in the future – owing to the performed investments – they will be increased in value, and at the same time their possible loss will not threaten the quality of his/her life. There is, however, part of investors who borrow a foreign capital for their business transactions, which is very hazardous and unadvisable because it can decrease the life level and bring to financial difficulties from which they can escape just after a long time and with an impact to the investor's personal life, which could result even in a personal bankrupt. It is necessary to be aware that each investment contains a certain measure of risk. Investments can be perceived by investors both positively and negatively; a series of objective and subjective factors participate in the overall feeling [13]. The positive impacts express themselves positively in the investors' behavior because they bring to the increase of property

assets, to the sense of happiness, satisfaction, euphoria, and the investors then continue working in other business activities. By contrast, negative impacts have absolutely opposite consequences which manifest themselves in increasing fear, uncertainty, pessimisms and can even result in an absolute termination of investing in financial markets. A certain benefit is that the present-day financial markets offer a wide spectrum of investment products. Investor may choose some of them and create investment portfolios from these investments, which bring to the decrease of the risk.

The target of this paper is to call attention to the often-neglected criterion, i.e. an availability of an investment for the investing public, and to describe a method of its evaluation. The main problem is that a series of beginning and unprofessional investors is excited by any investment product and talk about how they would perform their investment intentions in order to discover later that they do not have a sufficient initial financial capital and – because of it – they cannot enter the field of investments. Although the entrepreneurial environment modifies some of the investment products so that they were maximally available to the general public, there are certain investment products which are only available for highly-solvent groups of citizens, and there is no corresponding investment available for the general public.

Each investment has its own specifics. It is also valid for real investments which are accepted in this paper. There are investments which have just a capital yield. It is typical for precious metals and stones in a real form. The questions of precious metals are dealt with by, for example, [6], [8], [1]. Some investors, however, give priority to financial investments which pay out an additional yield by means of dividends, and – accordingly – prefer in principle only such companies which guarantee a reliable dividend policy [17], that's why they do not deal with real investments at all. Altman [2], Kuběnka [10] and others recommend using – while evaluating the risk of investment into a company – the financial bankrupt models which do not consider the dividend policy at all. Today's entrepreneurial environment with the support of financial engineering, however, creates and modifies investments so that they were available for the very general investing public. These modifications express themselves in the case of real investments by the sizes, dimensions, quantities of a precious metal and so on.

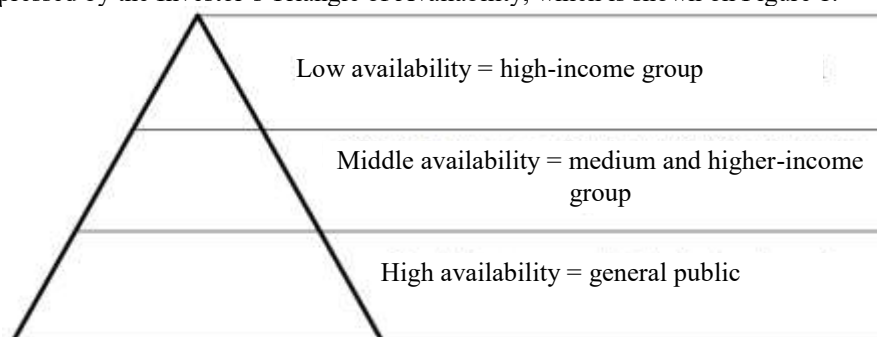
## **2 Used Research Methods**

Several scientific methods have been used in the article. The first one was analysis which was used for the search of literary and internet sources related to the studied issue therefore to the availability of real investments. This method was supplemented by synthesis when linking knowledge gained from available resources. This is followed by the comparison method which was applied i.e. in comparison of three levels of real investment availability which are derived from an asset market price, according to the economic conditions of individual investors. In addition, also principles of logical thinking and logic were applied, particularly when evaluating given investment possibilities in real investments with links to the selected macroeconomic variables and

when applying the used methods, for example, forming of Triangle accessibility from real investments. The aim of the article is to define criterion, which is investment availability for investment public and to describe the way of its evaluation. This criterion is very often underestimated and omitted because investments are primarily assessed according to the investment criteria only including profit, risk and liquidity. Introducing of this criterion makes easier decision making for investors according to their economic situation.

### 3 Availability of Investments for Investors

Most of unprofessional and beginning investors – prior entering any investment field – perform analysis of possible yields & risks and possible liquidity, but do not locate availability of the investment which is crucial for investments. In the case of investment intentions in real investments, the issue of investment availability is appropriate, and is derived from the market price of the asset, which is different at the given moment. Novotný [15], “divides availability into three levels: high, middle and low. High availability means that the general public can acquire the investment; middle availability determines a medium and higher income group, that’s why this investment product is not available for the wide range of investors because there is a higher financial barrier here for the low-income part of the public. The last level of availability is created by the high-income group which is the smallest and which can buy investment products which are not accessible for the above-mentioned groups.” This availability is expressed by the Investor’s Triangle of Availability, which is shown on Figure 1.



**Fig. 1.** Investor’s Triangle of Availability. [15]

Investment availability is closely associated with compilation of an investment portfolio which is influenced by the economic conditions of each individual, and also with other attributes such as an approach to risk, to a required yield and to investment instrument’s liquidity. Some authors, such as [9] and [16] emphasize that it is worth to have a portfolio and that it is a good idea to invest in several different investment instruments both in the domestic market and at the international level. At the present, the assortment of the investment products – owing to the globalization processes – is enormous. An investor now can choose not only an investment instrument but also a

country and continent where he/she is going to perform his/her investment intentions. These processes influence an expansion of availability of the products having a global character.

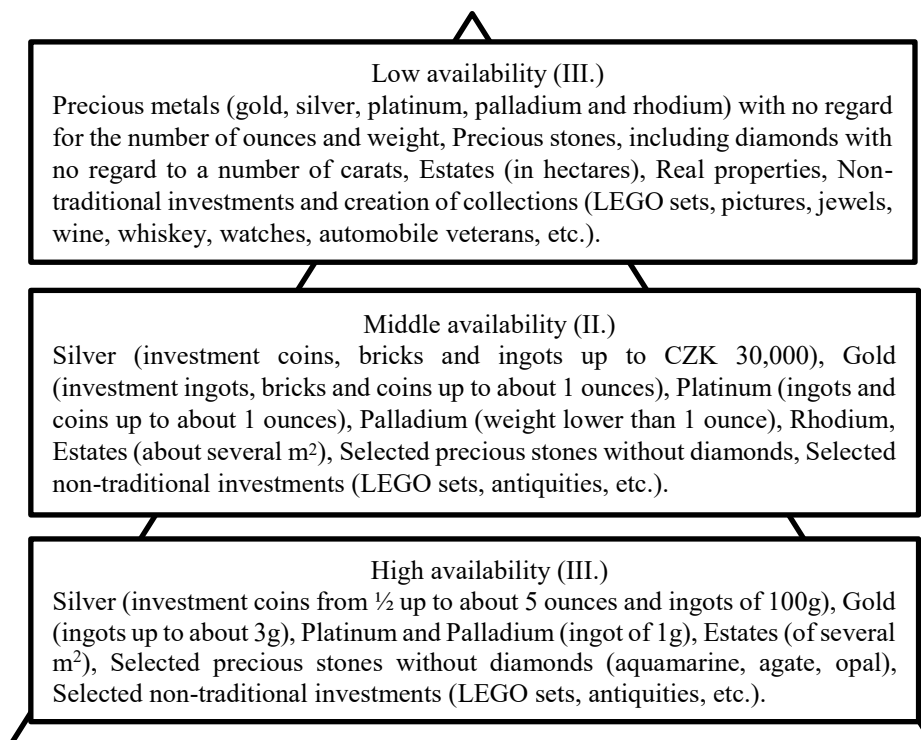
#### **4 Analysis of the Influence of the Entrepreneurial Environment upon Availability of Real Investments**

In order to reach the set goal, the current business environment is characterized from the investor's point of view, using macroeconomic variables, such as the unemployment rate, inflation rate and the average and minimal wage. Based on calculation of possible savings, there are defined boundaries of availability for particular groups of investors, and investment possibilities related to real investment instruments are also shown in a form of case studies.

Owing to the entrepreneurial environment, it is possible to modify investment products so that they were available for maximum number of investors. The higher availability is, the greater number of investors has a possibility to purchase such an investment product and to create compositions of investments, reducing – by this – a risk of loss. The following model cases show a price availability of selected real investments and their combinations providing that – according to [14] – an average Czech person saves up CZK 3,600 monthly, it means CZK 43,000 per year. This amount of the saved financial resources represents high availability. Middle availability comes from the amount of the average wages and assumes monthly savings on the part of investors up to CZK 30,000, i.e. CZK 360,000 annually; and low availability was defined above the level of the average wages, i.e. about the boundary of CZK 30,000 per month, it means more than CZK 360,000 per year. Seeing that the Czech Republic economics has been growing for already five years in a row, it positively expresses itself in a growth of incomes of private households. The average wage reached around CZK 30,000 in the first quarter of 2018, which is accompanied by a low inflation rate below 2.5% over same period. (according to the [5]) in the first quarter of 2018. And the minimum wages respond to it by growing. It reached CZK 12,200 from 1st January 2018. Compared with 2017, it has grown by CZK 1,200 from the original amount of CZK 11,000. It means relative annual growth almost of 11 %. It consequently results in low fears of losing job because the Czech Republic has the lowest unemployment level in the whole European Union, which reaches 3.1 %. And this increases tendency to investing [12]. The below-mentioned model cases don't include charges and other transaction costs related to the investment intentions.

As for the assortment of real investments in the Czech Republic, it is possible to invest in precious metals, precious stones, estates, real properties and alternative investments. The following Triangle of Investment Availability is compiled from selected real investments offered in the territory of the Czech Republic, into which an investor can invest under certain economic conditions. These conditions have a fundamental influence upon the assortment of real investments in particular parts of availability. The better economic conditions of an individual are, the higher a selection

of investments is; whereas the greatest number of them is in the low level and the lowest number of them is in the high level of availability.



**Fig. 2.** The Triangle of Availability compiled from selected real investments. [15]

As can be seen from Figure 2, the entrepreneurial environment creates certain investment conditions for all income groups. In the case of precious metal, it is, first of all, a possibility to invest in silver - here is a significantly wide offer even for non-professional investors. It is possible to perform relatively extensive investment intentions and to create, thus, collections based on this precious metal in the future.

Possibilities of investing for small investors (group I.) can be shown via the following case study. Supposing savings of CZK 3,600 per month, an investor may purchase, for example, a silver Argor-Heraeus 100g ingot for CZK 1,791 and two one-ounce (remark: Troy ounce) Australian Swan investment coins for the price of CZK 1,335 and Australian Kookaburra for CZK 474 [4]. The investor would begin realization of his/her strategic intention in silver by this investment decision. Such a decision related to the type of real investment can be considered to be well-founded because quantity of silver is less than gold and it is metal which has an unsubstitutable position in the industry. It is however possible to carry out other transactions than just with silver or other metals.

Here is also a possibility of other non-traditional investments such as, for example, LEGO. The LEGO for a Czech investor is very well-known company, and it is also

valid for its toys which can be bought in a wide network of stone shops as well as in e-shops, so their availability from the point of view of their purchasing is significantly higher than availability of precious metals (a number of sale-points for precious metals is considerably lower). In the case of LEGO toys, it is a relatively non-demanding investment with regards to a necessity of initial capital, and the age of the investment plays no role here. LEGO sets which bear "exclusive" sign, can hardly be found and is going to be excluded from the assortment on the market soon are suitable for investing. As an example of suitable products of LEGO Company for small investors can be two products marked as exclusive and with the price lower than CZK 3,600, namely: The railway station in a snowy village (CZK 1,799) and the Fire station in a winter village (CZK 2,399) [11]. No other costs are, in principle, related with this investment, because what must be only ensured is to provide preservation of the product without damaging (it means to ensure suitable storage conditions).

It is also possible to carry out investments in precious stones, but it can be only suitable for a limited group of investors, because the market is less liquid, even in comparison with the precious metal market. Beside of that, small investors don't own sufficient capital and at the present time there might be a risk of buying imitation in the case of processed stones. Small investors underestimate verification of stone authenticity, maybe by reason that they don't want to increase their purchase price.

Investments in estates are not also suitable for investors with a minimum free capital, because the purchase of several square meters is only suitable for own needs and for managing these lands, but not for investment intentions - purposeful estates with an area more than 10 hectares are only suitable for such intentions.

Another case study is focused on the middle availability (group II.). These are investment intentions which reflect a higher liquidity and yield due to a higher assortment of products into which an investor can invest. Speaking of precious metals, it is possible to choose, for example, gold. An investor may purchase a one-ounce coin which is more liquid than 1g of bare metal. As an example, it is possible to buy gold coins of American Eagle (CZK 28,793), American Buffalo (CZK 29,909) and Canada's Maple Leaf (CZK 28,462). Possibilities of investment in platinum are also extended, where it is possible to purchase one-ounce investment coin, for example, Britannia 2018 (CZK 26,438) and further investment bricks, for example, of Pamp 5g (CZK 5,712). In the case of selection of investment in palladium, it is possible to invest in products with a weight lower than one Troy ounce such as, for example, a 10g Pamp brick (CZK 11,462). The investment intentions for this group of investors are also extended by precious investment metal - rhodium, whereas it is possible to purchase a ¼ ounce Bairds UK brick for CZK 21,842 [19]. Investments in precious stones also provide other possibilities. It is possible to purchase several-carat products, where their purchase price is higher than CZK 3,600 - for example, blue topaz - 3,35 carats (CZK 7,440), purplish red ruby of 0,94 carat (CZK 6,895), light green emerald of 3,39 carat (CZK 14,159) and others [18]. Transactions with lands are also more accessible, however their investment potential has no sense for the investment purposes now, and it can be more likely purchased for own needs. The benefit of this group of investors is that a portfolio of non-traditional investments is being extended, for example, by valuable antiquities such as a Girl on a House statuette (CZK 8,900), author of which

is Grath Anton [3]. Middle availability is connected with a higher free capital of the investor, so an extension of investment opportunities to more investments enables decreasing the portfolio risk.

Low availability of investments is connected with the lowest number of investors who, however, can invest in the highest number of investment instruments. They then may extend their portfolio by investment products which most of investors cannot reach to.

A suitable investment during last years were estates (a land with an area of 10 hectares and higher is suitable for investing), because their prices was growing every year. At the present time, an average market price of one hectare of agriculture land is CZK 235,100 [7]; but the question is whether the prices couldn't stop growing, because the market price is very different from the official price (owing to the provided donations to such entities who manage the land). An interesting investment opportunity is the purchase of a real property for the purpose of its renting or future sale. With respect to strengthening the conditions for gaining a loan for housing, there will be permanent interest for the rent of real properties. These investors (group III.) may also include investment diamonds into their portfolio of precious metals, for example, 1,040 carat-diamond for the price of CZK 228,569 [18]. Their portfolio of non-traditional investments is also significantly extended, because the minimum recommended investment, for example, in investment stamps is from a half-million of CZK, in wine from CZK 250,000 and so on. A benefit of these investors is a high diversification of risk, a possibility to invest in real instruments which for a series of citizens are unavailable with regards to their financial possibilities, and, by this, reaching higher yields.

## **5 Discussion**

For all investments, no matter if it is financial or real, primary investment criteria are to be evaluated, however it is necessary to remember that it is impossible to firstly evaluate yield, risk and liquidity unless the investor's financial situation is cleared-up in advance. Not earlier than after detection of the economic situation, investment products accessible and suitable for him/her can be offered.

Real investments, as a rule, have lower riskiness compared to the financial investments, however this higher risk is connected with their higher possible yield. On the other hand, it is beneficial if investors at least part of their financial means invest in real assets and diversify, by this, their risk. The benefit is that the entrepreneurial environment is disposed toward investments and creates investment opportunities so that it modifies part of products in order to ensure their availability for the general public. The problem, which was sketched in this paper, is insufficient knowledge of availability of investments, especially among small investors who do not have enough information on the investment instruments. The assortment of real products thus continues to be limited, and investment intentions are not being extended, especially on the part of small investors. The above-mentioned case studies are therefore determined, first of all, for this group. On the basis of the limitation of certain extreme values of the



free capital, investment possibilities for another, financially stronger, investors were also shown.

A big problem of the Czech environment is - both from theoretical a practical point of view - absence of purposeful literary sources focusing on some types of real investments such as platinum, palladium, rhodium and alternative investments as a whole. This paper may contribute to increasing consciousness of real investments and, by this, support origination of investment intentions in real - maybe even less popular - investments. For completeness' sake, it is necessary to mention that not only own sources can be, of cause, used for investing but it is possible to use also a foreign capital. In this case, it is necessary to assess costs for the foreign capital compared to the investment's rate of profit.

## 6 Conclusion

A decision to perform investment intentions in real investments has to be derived from financial possibilities of the investor, what limits the assortment of these instruments. Each beginning investor should invest in such instruments which he/she at least a little understands or which he/she will chose on the basis of recommendations of an expert having proper experience. It is the only way how to eliminate risk. Investors are divided into three groups depending availability of investments, namely on the basis of their financial possibilities. It doesn't mean that an investor has no chance to move within the specified groups; a positive change of his/her economic conditions can be enough, which can be a result of his/her career growth in job, inherited property, etc. The investor also doesn't need to purchase investments regularly (monthly, quarterly), but he/she can only invest once a year or once a more years, what will enable him/her to save more financial resources and purchase an investment instrument with a higher purchase price. No investment instrument guarantees reaching the expected yield, however real investments are historically connected with a certain sentiment, so their riskiness can be considered lower compared to shares and other financial instruments. The current entrepreneurial environment is favorable for the real investments.

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## Open Science, Open Research Data and some Open Questions

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**Abstract.** Open access to research data is one of the key themes of current science and relevant research and development strategies at least in Europe. A systemic change in the modus operandi of science and research should lead to so-called Open Science. This overview paper presents the principles of Open Science and in detail "FAIR data" as one of the key assumptions for open-access research data. Research data meeting the criteria FAIR data must be findable, accessible, interoperable and re-usable especially for machines. Data elements are viewed in modular way - data elements, persistent identifier and metadata. There are, as a final discussion, mentioned three areas crucial for further elaboration and application of concept of open research data: elaboration of sophisticated methodology; analysis of financial aspects of open research data for research institutions; and linkage with the assessment of research institutions as an important incentive.

**Keywords:** Open Science, Open Research Data, FAIR Data.

### 1 Introduction

Science and its methodology develops over time. In the history of modern science, this process was primarily an internal affair of science and the development of its paradigms. In recent decades, however, the methodology of science has more than ever been significantly influenced by technological developments, which nevertheless relate to scientific knowledge, and to the science policy that emerges from general politics.

Science and research activities rely by many ways on ICT and in same time research generate inexhaustible quantity of digital content. This digitalization brings new challenges and one of nowadays paradigms is openness - open access to research publications and research data. This paradigm is called Open Science. The production of research data is growing significantly every year, bringing a number of challenges and challenges not only in terms of their processing and accessibility but also in the field of science methodology itself. Efficient processing of research data is possible only by machine technology, which brings additional demands on digital scientific data.

In this overview paper, we will focus on the concept of FAIR data, a set of basic (minimum) policies and practices designed by the eScience community that allows people and machines to easily search, access, collaborate, and reuse research data. The

aim of the paper is to approach the individual principles of FAIR data within Open Science, the modular concept of a data object based on these principles and, in particular, to point out some possibly problematic issues of open research data and the FAIR principle .

## **2 Open Science**

Science and its individual disciplines are evolving. There is also a change in the way of its operation and the source and mechanism of science funding. Technological development (which in itself is the result of scientific knowledge) offers new tools for research and dissemination and publication of results. Digital technologies offer a faster and cheaper way of presenting results than before. The society's relationship to science and the development of science is also changing. Science and its strategic development have become part of wider political concepts.

In the last decade we can therefore meet the concept of Open Science (or earlier Science 2.0) with three main attributes [4]:

- A significant increase of scientific production, open research and remote collaboration and online (open) access to scientific information.
- An emergence of data-intensive science by availability of large-scale datasets (petabytes) and by high performance computing.
- An increase in the number of actors in science.

Open Science is therefore a systematic change in the modus operandi of research activities and is affecting the research cycle and all of its stakeholders. Research process in open form is shown in the following figure.

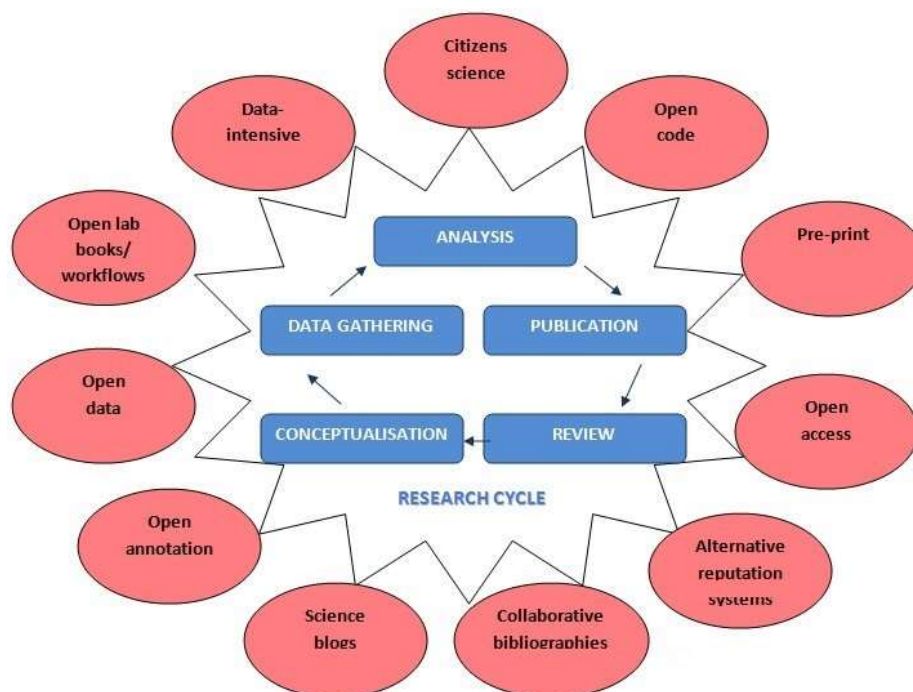


Fig. 1. Open Science trends [4].

Although there are many Open Science trends, open access is the most discussed and elaborate one, at least in terms of science policy within the European Union. According to [3] “open access refers to the practice of providing online access to scientific information that is free of charge to the end-user and reusable” and scientific information are divided to categories: peer-reviewed scientific research articles and research data. It is very important how access is defined. Access is not only “the right to read, download and print – but also the right to copy, distribute, search, link, crawl and mine.”

Research data in this context are data (statistics, results of experiments, measurements, observations, survey results, interview recordings and images) in digital form allowing users to freely access, mine, exploit, reproduce and disseminate them. Open access to scientific publications and research data will according to European science policy (especially through Horizon 2020) improved quality of results, encourage collaboration, avoid duplication of effort, speed up innovation and involve citizens and society to science.

### 3 FAIR Data

A much more detailed specification of research data features within the Open Data concept is the so-called FAIR Data principle. The basic document dealing with FAIR Data is the Guidelines on FAIR Data Management, which specifically addresses the recommendations for the Horizon 2020 R & D beneficiary or the participants involved in the Open Research Data Pilot, but its impact on the scientific community is wider and touches the issue of openly accessible scientific data in general. The guide does not detail the principle of FAIR data. It contains only an initial indication that it helps the beneficiaries to make their research data findable, accessible, interoperable and reusable (FAIR) and also states in the annex that the research data should comply with the FAIR principles, and refers to FORCE11 and a published article in Nature [7] for further details. The FAIR Data principle is built on work of the Concept Web Alliance and the Joint Declaration of Data Citation Principles with no direct reference to any theoretical concept of metadata.

So let's look at the FAIR data concept. The principles are not only related to the data itself (in a strict definition), but also to the research procedures, algorithms and tools that lead to the production of such data. In the basic breakdown, there are 15 principles or recommendations that research data should meet:

#### **To be Findable:**

- F1. (meta)data are assigned a globally unique and persistent identifier
- F2. data are described with rich metadata (defined by R1 below)
- F3. metadata clearly and explicitly include the identifier of the data it describes
- F4. (meta)data are registered or indexed in a searchable resource

#### **To be Accessible:**

- A1. (meta)data are retrievable by their identifier using a standardized communications protocol
  - A1.1 the protocol is open, free, and universally implementable
  - A1.2 the protocol allows for an authentication and authorization procedure, where necessary
- A2. metadata are accessible, even when the data are no longer available

#### **To be Interoperable:**

- I1. (meta)data use a formal, accessible, shared, and broadly applicable language for knowledge representation.
- I2. (meta)data use vocabularies that follow FAIR principles
- I3. (meta)data include qualified references to other (meta)data

#### **To be Reusable:**

- R1. meta(data) are richly described with a plurality of accurate and relevant attributes
  - R1.1. (meta)data are released with a clear and accessible data usage license
  - R1.2. (meta)data are associated with detailed provenance

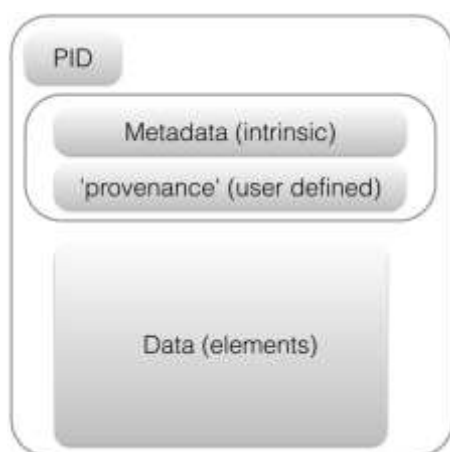
### R1.3. (meta)data meet domain-relevant community standards

These policies should not serve as a standard or specification, nor does it address the technical implementation of the data produced and stored. Their intention is to assist scientific institutions and research teams in deciding on a specific way of realizing the digital outputs of their research so that these outputs can be searched, accessed, involved in further research, and further exploited within the scientific community (and not only). It is in fact an explanation of the scientific-methodological requirements for digital outputs of scientific work and the scientific and methodological assumption of machine evaluation and mining of research data.

The core of FAIR data is the internal structure of data and data objects in terms of subsequent practical steps with regard to the formatting and publication of research data. Given that the main objective of FAIR data is that data is findable, accessible, interoperable and reusable (FAIR for machines), data is limited to digital data only.

Each data object is therefore a digital object where the data object is defined as an identifiable data item consisting of data elements, metadata and identifier. The smallest data object is a simple identifier that refers to a concept (ie, an idea or a "unit of thought") that does not have the nature of a digital object. Each data object should then, according to FAIR principles, include at least one persistent identifier (PID).

The FAIR principle requirement is that each data object as a whole is assigned a PID and at least a minimum set of metadata about the given data object. The data object may contain its own intrinsic and user defined metadata and contain from one to a large number of data elements. The modularity of the data object is shown by the following figure.



**Fig. 2.** Modularity of a data object [6].

The individual data element can then be used, quoted or distributed separately as a new data object with a new PID and correspondingly selecting the metadata of the original data object so that traceable binding and citation to the original data object is traceable.

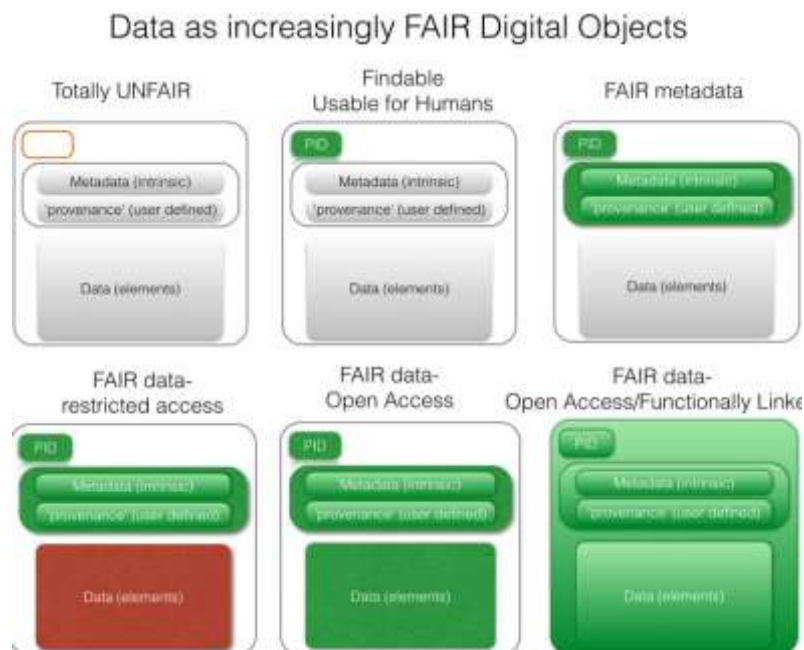
Storage of scientific data for machine-readable data (so-called FAIRports) must meet the following conditions:

- Include FAIR data objects (verified by appropriate authority)
- Provide given data objects under strictly defined accessibility conditions for reuse
- Provide a complete and open-access description of all technologies, dictionaries, and data formats used

FAIRport must also contain data objects at least level 1 in terms of their FAIRness (FAIRness). Explicitly level 1-4 is described, but from the next description we can extend this range by two transitions to:

- Level -1 = There are data objects in the repository that do not have PIDs or their own internal metadata
- Level 0 = Each data object has a PID, but some data objects do not have their own internal metadata
- Level 1 = Each data object has both PID and its own internal metadata
- Level 2 = Each data object has a full FAIR annotation, ie its own internal metadata and user defined metadata demonstrating the origin of the data elements in the FAIR format
- Level 3 = Data elements in data objects technically meet FAIR principles but are not fully open and reusable
- Level 4 = All data elements and metadata meet the FAIR policy conditions and are completely publicly accessible for a clear licensing.

Graphics of these 6 levels are captured by the following picture:



**Fig. 3.** Levels of FAIRness [6].



## 4 Conclusion - Open Questions for Open Data

In the presented text we have been devoted to the characterization of the concept of Open Science and in greater detail the principle of the FAIR data and its internal modularity. As a final discussion, it is advisable to mention some of areas that we consider to be crucial for further elaboration of these concepts and, in particular, their introduction into scientific practice.

Documents at both European and national levels contain only a general postulation of the Open Data principles, or refer to other working documents on the topic. Therefore, a sophisticated methodology is missing. In this respect, research community outputs (eg via the Research Data Alliance) rather than official bodies can be expected. In case of the Czech Republic, Association of Libraries of Czech Universities (ALCU) signed in year 2012 Berlin declaration and publish ALCU Open Access Policy. Subsequently, on June 14, 2017, the Czech National Strategy for Open Access to Research Information for 2017-2020 has been approved by the Government of the Czech Republic. So the Open Science principles are there gradually implemented at a very general political level.

Although the obligation of open research data (which complies with FAIR data principles) is already pilot-tested and is becoming a requirement of many science-funded programs, there are no studies to analyze both direct and indirect financial aspects of open research data for research institutions and benefits).

Promoting open research data must be linked to the assessment of research institutions and research teams as a major incentive. Moreover, if it is properly matched with funding, it will be an effort of most research teams to provide their research data in an open standardized manner.

In spite of the open questions linked to open research data, it is certain that this is one of the major trends in science policy and science will become more open than in the past and the paradigm of open science, including the principles of machine processing of scientific data, will transform it and transform its methodology.

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## Personality Traits' (BFI-10) Effect on Tax Compliance

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**Abstract.** The tax compliance is in the centre of the interests of researchers of different professional areas, as it has direct impact on the state revenues. The paper contributes to the explanation of the possible factors influencing the tax compliance, from the personality point of view. Big Five Inventory - 10 (BFI-10) instrument was used to measure personality traits. The research was conducted in the Slovak Republic. Only one of the personality traits, conscientiousness, has impact on the tax compliance. The results also provide evidence of the relationship between the tax compliance and two control variables - gender and way of living.

**Keywords:** Tax Compliance, Personality Traits, Empirical Research, Quantitative Methods.

### 1 Introduction

The question of paying taxes is in the centre of different researches aimed at the tax compliance. Most of the tax payers have a tendency to pay taxes even when the possibility of the tax evasion revelation is low [14].

In spite of that, the tax evasion extent is still rather large. The value added tax accounts for the most important share in the tax gap, as well as in the structure of the taxes revenues to the state budget. Also, the value added tax frauds can be hidden more easily. But the tax gap also arises from other taxes, namely from the income tax. The average level of the tax gap, expresses in % of GDP, is 10.7% in the EU (28 countries). The lowest tax gap is in Luxembourg (1.6%), and the highest one is in Italy (13.8%), Estonia (13.6%). In Slovakia, where the research was conducted, it is 7.3% [10]. We can think of Slovakia as a country with a middle degree of tax morale.

The tendency to pay taxes, or vice versa, to avoid paying taxes has, therefore, been the subject of different researches [1, 6, 9, 12] but this question has not been exhaustively answered. One of the findings is that tax compliance is positively related to tax morale [7]. Overall tax morale in the different countries, dependent on culture and the attitude of people to tax compliance, should also be taken into consideration.

An interesting relation is between the tax morale and tax evasion. According to Weck [15] there is a strong relation between the tax morale and the extent of the shadow

economy. This was confirmed also by Torgler [13] who concluded that the tax morale significantly reduced tax evasion. But the determining the factors that have an impact on tax morale and tax compliance is still insufficient. We agree that one of the factors influencing the tax compliance is the tax policy with all its means [3]. However, when moving to an individual level, the topics of tax morale and of tax compliance lead to the question how the personality influences the attitude to paying taxes. Thus, the objective of the paper is to provide new insight into the factors that impact tax compliance and to answer the question how paying taxes or trying to avoid paying taxes is influenced by personality and what is the share of various personality traits.

The Big Five Inventory framework includes five traits as the basic measures of individual differences: neuroticism, extraversion, conscientiousness, agreeableness, and openness to experience [2].

The structure of the paper is following: the introduction, data and methodology include the description of data, their collection, and how they were analysed. In the following section, results are presented and interpreted. The last section provides the conclusions.

## **2 Data and Methodology**

With regards to data, they were collected in September 2018. With regards to the sample, respondents were students studying at the University of Economics in Bratislava, Slovakia. In total, there were 209 students, of whom 199 (of whom 55 were men and 144 women) completed all relevant items of the questionnaire.

Students were asked to fill in the questionnaires with the incentive to find out the personality traits at the exercises aimed at the topic of personality. All the students were interested in participation in the research and approved using their questionnaire forms for the research purposes.

Personality traits were evaluated by the Big Five Inventory 2, i.e. a 60-statement version of the instrument for the Big Five Inventory; it was developed by John and Soto [8]. The instruction was to evaluate "How well do the following statements describe your personality" with statements preceded by "I see myself as someone who..." on a 1-5 Likert scale (where 1 stands for strongly disagree and 5 for strongly agree). The official Slovak translation of the instrument was used following the Slovak translation of BFI-2 statements by Halama and Kohút [8], as it was released on the web site of the authors of BFI-2. Additionally, we included 5 statements from BFI-10 [11] which are not part of BFI-2. This allowed us to compute BFI-10, and only these traits will be used in this conference paper.

The scenario from the experimental study on tax compliance [4] was used to examine the tendency to comply with the tax regulations or to avoid complying with tax regulations, though this scenario was adjusted to conditions in the Slovak republic. Instead of a 40% tax, a 19% income tax was used; instead of an absolute tax amount EUR 83330 we used EUR 4000. The 17% probability of tax audit was kept. The scenario was formulated as follows: The participants were required to pay a 19% tax on a self-employed income of EUR 4000 with an audit probability of 17% and a tax evasion fine equal to the amount of the tax evaded. A question was then to state how

much tax they would be willing to pay in this scenario. It will be used as the dependent variable.

Besides gender, respondents also provided information on whether they live with parents, with parents but during studies at the dorm or in a rented apartment, or they live their own household. These variables will be used as independent variables in the model alongside personality traits. Also, additional questions were included in the questionnaire but they have not been analysed in this paper.

Data will be analysed using General Linear Model. IBM SPSS 22 will be used for the analysis.

### 3 Results

Parameter estimates for the model explaining how much tax a respondent would pay given the demographic factors and personality traits are presented in Table 1.

**Table 1.** Parameter estimates for the full model.

Parameter	B	Std. Error	t	Sig.
Intercept	2611.500	744.429	3.508	.001
Extraversion	-77.201	101.606	-.760	.448
Agreeableness	-76.137	84.690	-.899	.370
Conscientiousness	-139.737	82.105	-1.702	.090
Neuroticism	-68.139	78.107	-.872	.384
Openness to experience	67.669	74.524	.908	.365
[Gender = female]	1431.535	580.389	2.467	.015
[Gender = male]	0 <sup>a</sup>	.	.	.
[Live = with parents]	1675.898	558.830	2.999	.003
[Live = with parents but during studies at the dorm or in a rented apartment]	1919.257	565.865	3.392	.001
[Live = own household]	0 <sup>a</sup>	.	.	.
[Gender = female] * [Live = with parents]	-841.656	616.418	-1.365	.174
[Gender = female] * [Live = with parents but during studies at the dorm or in a rented apartment]	-1255.543	623.361	-2.014	.045
[Gender = female] * [Live = own household]	0 <sup>a</sup>	.	.	.
[Gender = male] * [Live = with parents]	0 <sup>a</sup>	.	.	.
[Gender = male] * [Live = with parents but during studies at the dorm or in a rented apartment]	0 <sup>a</sup>	.	.	.

at the dorm or in a rented apartment]

[Gender = male] \* [Live = own household] 0<sup>a</sup> . . .

Legend: a. This parameter is set to zero because it is redundant.

The model per se is significant (p-value = .001). With regards to the explanatory power,  $R^2 = .149$ ,  $R^2_{adj} = .104$ .

Demographic factors, and interaction between them is significant at .05 level. From personality traits, only conscientiousness is significant at .1 level. Parameter estimates for the model only with conscientiousness and no other personality traits are provided in Table 2.

**Table 2.** Parameter estimates for the streamlined model.

Parameter	B	Std. Error	t	Sig.
Intercept	2193.751	591.600	3.708	.000
Conscientiousness	-150.596	79.006	-1.906	.058
[Gender = female]	1444.215	569.972	2.534	.012
[Gender = male]	0 <sup>a</sup>	.	.	.
[Live = with parents]	1665.636	554.757	3.002	.003
[Live = with parents but during studies at the dorm or in a rented apartment]	1852.420	553.758	3.345	.001
[Live = own household]	0 <sup>a</sup>	.	.	.
[Gender = female] * [Live = with parents]	-926.114	607.757	-1.524	.129
[Gender = female] * [Live = with parents but during studies at the dorm or in a rented apartment]	-1228.371	609.469	-2.015	.045
[Gender = female] * [Live = own household]	0 <sup>a</sup>	.	.	.
[Gender = male] * [Live = with parents]	0 <sup>a</sup>	.	.	.
[Gender = male] * [Live = with parents but during studies at the dorm or in a rented apartment]	0 <sup>a</sup>	.	.	.
[Gender = male] * [Live = own household]	0 <sup>a</sup>	.	.	.

Legend: a. This parameter is set to zero because it is redundant.

The model *per se* is significant ( $p\text{-value} < .001$ ). With regards to the explanatory power,  $R^2 = .139$ ,  $R^2_{\text{adj}} = .112$ . Signs of the estimates stayed the same, and the magnitude of impact stayed approximately the same.

To sum up, women and students living with their parents at least part of the year tend to be willing to pay a fuller amount of tax. The two factors together somewhat decrease the amount. And conscientiousness slightly decreases the amount.

## 4 Discussion

The obtained results are not surprising *per se*. However, it might have been expected that other personality traits, such as openness to experience or neuroticism could also influence compliance with tax rules.

In making a decision regarding a possible tax evasion, the conscientiousness is probably the most important. It can be partly explained by the perception of tax evasion as a professional problem and it is a decision for which one needs to be prepared in advance. Particularly the area of carousel fraud requires precise knowledge of tax legislation and the specificity of different tax jurisdictions as well as organizational skills.

It would be interesting to conduct a survey among entrepreneurs, or among people whose tax evasion was discovered by tax audits. However, we assume that it would be hard to motivate such people to participate in the survey in general; Even if they provided answers, there would always exist an issue whether the answers are sincere as people may fear to provide honest answers in spite of the survey being anonymous.

## 5 Conclusions

The impact of gender, independence of living of the respondents and personality traits on tax compliance was studied in the research presented in the paper, to contribute to the knowledge of the factors causing tax compliance, possibly tax avoidance and tax evasion.

Tax compliance is significantly influenced by gender and living setting of the respondents. Women and students living with the parents during their university study incline to pay a fuller amount of tax (EUR 4000, or almost EUR 4000). This is in compliance with similar research focused apart from other factors on relationship between the tax compliance and gender [5].

The results also provide evidence of the relation between the tax compliance and conscientiousness. The relation was negative, i.e. conscientious people tend to avoid paying taxes more than the others. The impact of other four factors, neuroticism, extraversion, agreeableness, and openness to experience was not confirmed. BFI-2, i. e. 60-statement version of the instrument for the Big Five Inventory [8] should be applied in forthcoming research (including facet scales), to explain the relation between the tax

compliance and conscientiousness in details and find out the facets (Organization, Productiveness, Responsibility) that are significant.

The other limitations are connected to using the sample that consists of respondents who study at the same university, although, the intention of the research was to focus the research on the students who would probably become entrepreneurs or would make decisions about the corporate taxes after graduating.

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## Employer Branding in Creating of an Organization's Image - Example of SME's

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**Abstract.** The paper's theoretical and empirical considerations were focused on the process of organization's image creating. The purpose of the research was to analyze the possibilities of using employer branding to create the image of an organization in a business environment. The theoretical basis of the organization's image and the employer branding issue are presented. Interpretation of the image was based on a simplified analysis of selected cognitive perspectives. In this paper, attention was paid, among others to competitive advantage, perception in the business environment, the brand and the identity of the organization. The phenomenon of the employer branding was explained by referring to the organization's value creating, human resource management, relational marketing, etc. Then the results of the empirical quantitative research were presented. Questionnaire surveys were aimed at recognizing selected tools of employer branding in creating the image of an attractive employer. The results confirmed the interest of SME's in using such employer branding tools as: social media, website, job fairs, and open days.

**Keywords:** Organization Image, Employer Branding, Employer Branding Tools.

### 1 Introduction

Striving to enhance their internal systems, enterprises increasingly focus their attention on actions aimed at improving their position in business environment. The current business environment is becoming ever more dynamic and difficult to predict. The ability to navigate through the space of social networking determines an organisation's success. Investing in the development of social potential by recruiting highly-qualified employees, implementing training systems to improve staff qualifications or creating a friendly environment in the organisation is becoming a common practice among enterprises.

It seems that today's labour market of highly developed countries requires strategic activities from enterprises to attract the most valuable employees. This can naturally be seen as connected with such phenomena as digitalisation of business processes or automation and robotisation. In this context, employees who create values for the organisation in the most productive way are its key resource. Thus, the ability to „attract” the most valuable employees to an organisation is regarded as a very significant factor in building the competitive advantage and using new business models in practice. This shows how important it is for an organisation to create an image that confirms its attractiveness as a potential employer. It is worth highlighting that the basics of the concept of employer branding can be used to consciously remodel an organisation's image for the purpose of the labour market.

## 2 The Goal of the Research and Methodology

The goal of the research presented in this paper is to examine the possibilities of using the employer branding concept to create the image of an organization. The research was based on theoretical and empirical studies. Exploration of selected tools of employer branding in the context of shaping an organisation's image was one of the stages of the research programme entitled „Trends and challenges in strategic management of SMS's in the Silesian Province" (the project was carried out between November and December 2016 among a group of small and medium-sized enterprises in the Silesian Province). Recruitment processes were analysed to identify key tools of employer branding. The aim of the research was to identify the factors determining interest in an enterprise as a potential employer. An organisation's image was accepted as the basic research perspective and viewed as an attribute that allows an enterprise to stand out against others in the labour market and facilitates processes of recruiting employees with high qualifications. The research hypothesis was formulated as follows: Conscious use of selected tools of employer branding makes it possible to shape an organisation's image that is desirable from the perspective of the labour market.

**Table 1.** Characteristics of the research sample

Total research sample = 320 (100%)		
Characteristics describing the respondents of the survey		
gender of the respondents	females	42.0%
	males	58.0%
age of the respondents (in years)	do 29	15.1%
	30-39	29.2%
	40-49	46.7%
	50-59	6.6%
	over 60	2.4%
education of the respondents	higher	43.4%
	secondary	44.8%
	vocational	11.8%
Characteristics describing the enterprises participating in the survey		
when the enterprise was established	...-1989 r.	12.3%
	1990-2000	48.6%
	2001-2010	28.8%
	2011-...	10.4%
scale of the enterprise's activity (market)	domestic	45.8%
	local	17.5%
	regional	30.7%
	international	6.1%
	microenterprise (0-9)	52.8%
	small enterprise (10-49)	40.6%

size of the enterprise, according to the number of employees	medium-sized enterprise (50- 249)	6.6%
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The empirical research was quantitative in character. By using a survey questionnaire as a research tool, the responses, which represented subjective opinions of the survey's respondents, could be presented as percentages. The research sample was 320 respondents. Detailed characteristics describing the research sample are presented in table 1.

### 3 Interpretation of Organization Image – Overview of Selected Cognitive Perspectives

In management studies, discussions on the topic of an organisation's image in accordance with Porter's classical approach are conducted in the context of generic strategies for competitive advantage. It is recognised that the issue of image creation may become an element of creating differential advantage [5, 16]. General interpretation of an organisation's image identifies the way of perceiving an enterprise in business environment [13, p. 127]. Perception means in this sense a certain established image of an organisation. It is agreed that "the corporate image is the perception that any audience has of an organization through the accumulation of received messages" [12, p. 21]. Thus, if a certain set of information about a specific organisation shapes its image in business environment, then the answer to the question: How to consciously create and manage information to successfully create the desired image of an enterprise? becomes key. This question is not groundless, especially from the perspective of the development of social relations in the network space and intensification of information flows.

It is based on information that opinions about organisations are shaped. In this sense, corporate image is defined as a „set of opinions, thoughts and impressions, which one creates about a firm or a product. Attitudes and acts of humans have connection with image of the firm or product" [9, p. 262].

When addressing the subject of corporate image, attention is also directed, apart from information, opinions, thoughts, impressions, attitudes and behavior of humans, to the organisation itself, which is perceived in terms of an entity functioning in business environment. Thus, corporate image is directly connected with the process of perceiving an organisation as an entity that exists autonomously or is associated with the creations of the organisation. This cognitive context suggests that image always involves something that exists beyond an organisation, is created in the minds or consciousness of external observers. In this sense, „when a customer regards your company as a good community player, honourable employee, an innovator or added value creator, then your outgrowth is trusted, you have achieved a successive level of image" [6, p.3].

An attempt to identify the essence of corporate image leads to distinction of two essential cognitive perspectives. The first perspective suggests that image should be examined by viewing it in terms of the nature of an enterprise's brand. The second one, in turn, explains image in the context of an organisation's identity. In both cases, the

areas of interests mainly include the scale of cohesion of both the concepts, their distinctiveness, dependencies existing between them and identified differences. Based on general interpretation of image and brand, both these concepts are inseparably intertwined. However, one can find a view in the literature that brand is a much more important and stronger attribute of an organisation compared to corporate image. It is stressed that „image can never be more important than the brand. But the brand may be nothing without its image – and can never be divorced from it” [14, p. 117].

An enterprise’s organisational environment drives, in a sense, the search for characteristics showing the distinction between the concepts of image and identity. There is a discussion in the literature that leads to identification of significant differences between these concepts. Interpretations of both these concepts usually raise the issue of an illegitimate identification of image with identity. It is strongly emphasised that „the corporate identity is the visual representation of the company and should not be confused with the corporate image” [13, p.127]. In this case, the separateness of both these concepts has to do with the dimension of visualisation of an enterprise in business environment. The visual representation usually means: corporate signature, corporate symbol or an enterprise’s logo [13, p. 127]. Meanwhile, the search of separateness on a semantic level leads to indication of corporate identity and corporate image [4, pp. 292-315]. When studying semantic differences between these meanings in the context of a substantial generalisation, it can be assumed that corporate identity is a sort of an organization’s „self-image“.

#### **4 Idea of Employer Branding**

The context of interpreting image as a certain perception of an organisation in business environment [13, p. 127] drives the search for ways to create the desired image of an enterprise. Moreover, the dynamic character of image, which is subject to changes, gives rise to the need to identify desirable image-building activities. This creates space for using the attributes of employer branding.

When attempting to define the idea of employer branding, one should start with definitions of brand. In this case, brand becomes a link, as it were, that binds the issues of shaping corporate image and development of employer branding. Indeed, when looking for interpretation of the term „image”, one can also find references in the literature pointing to its connections with brand [14, p. 117]. However, in the description of employer branding, the context of brand enters the sphere of an organisation value creation and management of human resources. Thus, brand is essentially regarded as one of key values of every enterprise. It is most often associated with such factors as: organisation’s name, product and/or service, graphical sign or logo of a product. However, if brand is viewed as an attribute that shapes interest of potential candidates for employees, then it can be regarded as an important part of Human Resource Management, HRM. Thus, the prospect of attracting highly specialised employees to an organisation strengthens the role of brand in effective management of human resources [10, pp. 19-26].

The context of recruiting highly specialised employees shapes the idea of employer branding. Discussion on this subject appeared in the academic literature already in the 1990s, as empirical research into this field intensified [1, 8]. However, as more and

more scientific reports on employer branding were appearing, one work became of key importance in that period of emerging of this research concept: The Employer Brand (by T. Ambler and S. Barrow) published in 1996. Employer brand was defined as „the package of functional, economic and psychological benefits provided by employment, and identified with the employing company” [3, p. 187]. The starting point for the emergence and development of this concept is regarded to be the assumptions of relational marketing [7, 15] and the widely accepted concept of Human Resource Management.

The perspective of offering benefits on functional, economic and psychological levels requires a detailed exploration of possibilities of applying the principles of employer branding. It turns out that the key issue is not the package of benefits alone, but above all preservation of the continuity of image building activities. The literature stresses that „a clear understanding and practical application of employer branding principles, based on establishing, maintaining and positioning of the unique attractive image of the company as an employer in the labour market enables the company to operate successfully in terms of the so-called war for talents” [11, p. 136]. One can thus gather that there is a need to shape the desired image in business environment by engaging in continuous image-building activities. Moreover, these activities should be thought-out and consistent with the assumptions of the strategy for human resources management. Thus, undertaking image-building activities requires not only coherence and consistence, but also employment of specific tools for positioning the organisation’s image in the network.

The description of employer branding provided in the literature confirms that the development of this phenomenon is a typical example of interpenetration of theoretical concepts present in scientific research and the ever-more widespread corporate practice. The empirical approach indicates a number of limitations to studies of employer branding. Especially if one considers the process of seeing, perceiving and analysing the reality. In general terms, brand is something elusive. It is noted that „brand concerns image, reputation, and identity: sometimes it is a fact, but it is always a perception” [2, p. 153]. Moreover, there is no clear evidence that an enterprise’s strategy regarding employer brand is necessary for it to have the status of an attractive employer. However, one can assume that a conscious application of the principles of employer branding may support the process of building the desired image of an organisation, strengthening its position in the labour market.

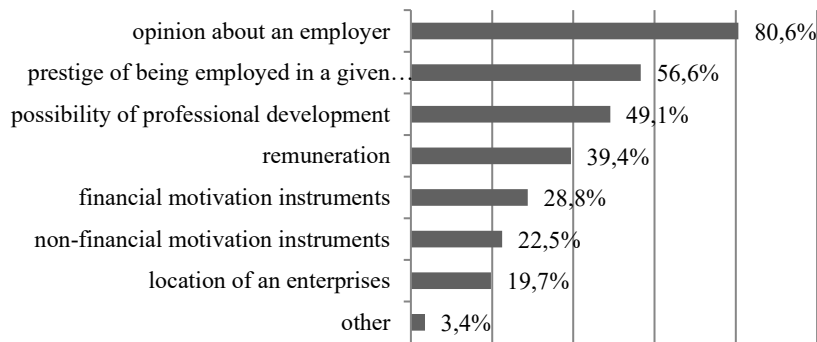
## **5 Employer Branding in the Practice of SME’s – Perspective of Recruitment of Employees**

### **5.1 Presentation of the Results of Quantitative Research**

The respondents participating in the survey expressly indicated that the opinion about the employer and prestige of working in a given organisation are the key factors determining their decisions to take up employment (fig. 1). The vast majority (over 80% of those surveyed) viewed the opinion about the employer as relevant. According to over half of those surveyed (56.6%), the prestige of being employed in a given

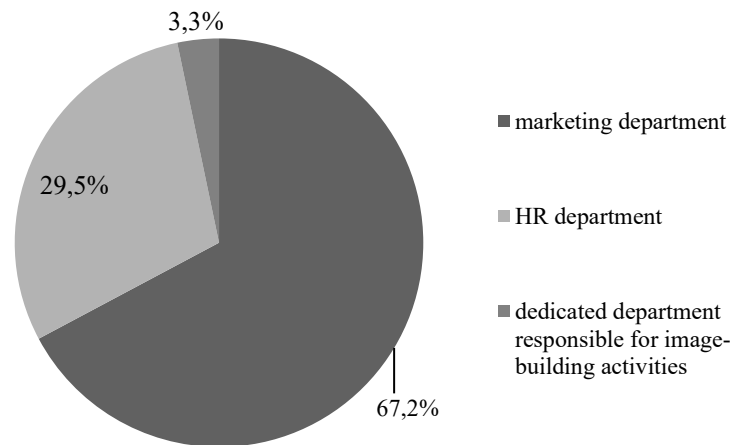
organisation is a very important factor in considering its offer as interesting. Of importance is also the possibility of professional development (49.1% of the respondents). The standard instruments of financial and non-financial motivation were only recognised by slightly over 20% of those surveyed (28.8% and 22,5% respectively).

Analysis of selected factors that determine employment confirms that the image of an organisation as a potential employer is becoming increasingly important in the recruitment process. However, it is worth stressing that small and medium-sized enterprises, despite problems with acquiring highly qualified employees, are still paying little attention to image-building activities. Only 19% of those surveyed (19.1% to be exact) notice image-building activities carried out in the organisational environment of the companies in which they are currently employed. Worryingly, over 80% of those surveyed (80.9% to be exact) claim that their company does not engage in any activities aimed at image building.



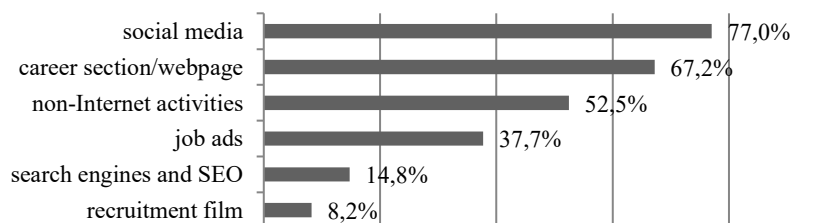
**Fig. 1.** Selected factors determining employment in an enterprise – SME sector.

It is worth stressing that corporate image-building activities are most often undertaken together with marketing activity and human resource management. In the organisational environment of the enterprises surveyed, in the vast majority of cases, marketing and HR departments were engaged in image-building activities (fig. 2). Over 67% of the respondents indicated involvement of marketing department employees, and almost 30% of those surveyed recognized the involvement of HR department (67.2% and 29.5% respectively). Only 3.3% of the respondents, which accounts for only 0.9% of the research sample, could identify a dedicated department in the organisational environment of enterprises that engage in image-building activities.



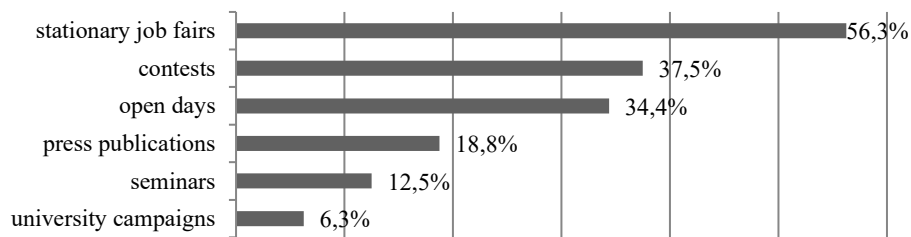
**Fig. 2.** Enterprises' internal organisational units involved in image-building activities – SME sector.

When exploring employer branding tools in the context of a conscious creation of corporate image, one should emphasize particular importance of social media. According to the overwhelming majority of those surveyed, social media and the career section/webpage are among the most common tools employed to enhance image in small and medium-sized enterprises. The contribution of social media was indicated by as many as 77% of those surveyed (fig. 3). The respondents expressed significant interest in the use of the career section/webpage. This tool is a kind of a „business card” of an organisation that is a potential employer, and thereby it aids the recruitment process.



**Fig. 3.** Selected tools of employer branding in SME's.





**Fig. 4.** Non-Internet tools of employer branding in SME sector.

The survey results show that the most underrated tools of employer branding include: job ads and search engines and SEO (Search Engine Optimization) (fig. 3). According to those surveyed, job ads have the greatest impact (37.7% of the respondents). Almost 15% of the respondents indicated the use of search engines and SEO (14.8%). A recruitment film was regarded as the least useful tool (8.2% of those surveyed). Over half of the respondents (52.5%) indicated non-Internet activities aimed at building corporate image (fig 3). A detailed look at such activities shows that off-line job fairs are a key, non-Internet tool of employer branding (fig. 4). It is followed by organisation of competitions and open days (37.5% and 34.4% respectively). In the context of image-building activities, seminars and meetings at universities are the least commonly used tools among enterprises.

## 5.2 Results of the Empirical Research

There is a widespread view that activities aimed at creating corporate image identify an organisation's position in the external environment, including in the labour market. The „status” of an organisation improves its image as an attractive employer, becoming an ever-more important factor determining interest among potential employees. Of importance is also a recruitment process, during which particular attention should be paid to such aspects as: manner and tools of communication with the candidate, assessment of competencies, and the quality of feedback. The experience of small and medium-sized enterprises confirms that the context of creating corporate image and the improvement of recruitment processes increasingly involve the use of employer branding tools. The quantitative research conducted among small and medium-sized enterprises indicates the following:

- frequent use of social media for creation of corporate image,
- reliance on the career section/webpage when searching for information about an organisation and recruitment rules,
- insufficient promotion of job ads through search engines and recruitment films,
- engagement in non-Internet activities aimed at creating corporate image.

It is a fact that social media, both professional (such as Goldenline, LinkedIn) and mass (i.e. Facebook, Twitter) are actively used to create the desired image of an organisation. It seems, however, that real benefits in this respect can only be achieved by those organisations whose internal organisational system is open and flexible. Indeed, system

openness and flexibility enable relations to be created, used and maintained. Thereby, they are a condition of an open discussion with Internet users.

The respondents participating in the survey expressed great interest in the use of the career section/webpage. This tool is treated mainly as a platform used to obtain up-to-date and reliable information. Thus, of importance is the „form” of this section/webpage, including especially:

- attractiveness of the webpage/section,
- appearance that attracts attention and wins users’ trust,
- reliability, up-to-date character and manner of presenting the information,
- employed visualisation tools.

Analysis of another tool of employer branding shows that search engines are minimally used to promote job offers. Small and medium-sized enterprises still do not recognise the potential of search engines (e.g. Google) and take insufficient actions in the area of SEO. It seems that such activities would allow a job offer to reach the target group of specialists. Similarly, an interesting recruitment film could act as an effective tool not only in a recruitment campaign but also in a promotional campaign of an enterprise.

When creating their corporate image in the external environment, small and medium-sized enterprises also focus on non-Internet tools of employer branding. Given the need to integrate business and academic environments, it seems very surprising that such image-building activities as seminars or meetings organised at universities are not widely used. Corporate image is mainly created through organisations’ activity at job fairs. Thus, one can gather that classical forms of making potential candidates for work interested in job offers prevail. Exchange of information and experiences during seminars and meetings organised at universities is still unrecognised.

## **6 Conclusion**

The results of the empirical research were used to draw conclusions about creation of corporate image in face of the need to stand out against the external environment and improve recruitment processes in order to ensure a successful recruitment of highly competent employees. Referring to the research hypothesis formulated in this paper, one can postulate the possibility of using employer branding tools for shaping the image of an organisation that is desired from the perspective of the labour market.

In the business environment, corporate image is an important attribute of an organisation. Not only in the context of the possibility of achieving a business position that is important in terms of cooperation or the creation, use and maintenance of network relations. It turns out that corporate image determines interest among potential candidates for employees, especially those highly qualified. It is a condition for success, as it were, of the recruitment process, forming the basis for developing an organisation’s social potential. It is worth highlighting the need to improve the properties of social potential, especially such as knowledge, skills and social competences.

The empirical research conducted on the sample of 320 respondents clearly shows that small and medium-sized enterprises in the Silesian Province are by far insufficiently interested in engaging in image-building activities. The group of

enterprises that do engage in image-building activities apply employer branding tools. Particular usefulness is attributed in this respect to such tools as social media, the career section/webpage and non-Internet activities (i.e. off-line job fairs, competitions and open days).

However, the use of employer branding tools for shaping corporate image that is desired from the perspective of the labour market is not limited to activities aimed at attracting new employees. It is worth emphasising strongly that the use of employer branding should not stop when a potential candidate for an employee becomes interested in the job offer, is „attracted” and finally employed in an organisation. It seems necessary to invest in the already possessed social potential to increase employees’ satisfaction and involvement. Such approach may constitute a basis for building an image of a reliable and attractive employer.

It is also worth noting that the present intensification of migration processes also should be reflected in the image-related strategy of modern enterprises. It seems important at this point to pay attention to such issues as multiculturalism, diversity or virtuality. Image-building activities should thus involve the sphere of creating a desired image of an enterprise to the outside world and that of creating a friendly internal organisational environment. In this context, an attractive employer is one that shapes the internal organisational environment based on such principles as respect of values, acceptance of otherness, acceptance of changeability and uncertainty. It also recognises the need to constantly improve the organisation by remoulding the concepts of business to adjust them to the current conditions. Relating the issue of creating corporate image to the character of migration processes may be a very interesting perspective for further empirical research.

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# Dynamic Containers Loading Problem

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**Abstract.** This paper deals with the container loading problem where parcels need to be loaded in the certain time interval. The aim is to load all parcels while minimizing the number of containers. The capacity of the container can't be exceeded. Every parcel has its given volume. At the same time, this paper also deals with container's time schedule, therefore with planning the time when the container will be used for parcel transport. Then the mathematical model is proposed and tested. In practice, container loading goes continuously, therefore heuristic solution method on an unlimited time interval is proposed for this problem. Information about parcels is available gradually. The method is illustrated with a numerical example.

**Keywords:** Container Loading Problem, Heuristics, Integer Programming.

## 1 Introduction

Freight transport represents a continuous process of shifting goods from a manufacturer to customers through chain's warehouses. Various means of transport and containers are used. The aim is to minimize transport costs, which is related to optimizing the type of mean of transport, route of transport and also with optimizing vehicle's or container's capacity.

This paper is focused on a certain part of optimizing the transport of goods, namely on the container loading optimization, where the requirement for transporting goods is defined and the time when the transport of the goods must be realized is within a certain time interval. Demand of loading in the time  $i$  will be denoted as parcel  $i$ . The volume (weight, volume, load area...) and time interval, during which the shipment should be loaded, is known for each parcel. This information is available for a certain period of time. The aim is to minimize the number of used containers for this period. Every parcel must be loaded, and the capacity of containers is limited. When solving this task for a finite period of time, ineffective container loading occurs at the end of this period. Therefore, it is necessary to solve this task within an infinite time horizon, gradually gaining information about future parcels.

In literature, this task is solved as static, but the problem of locating parcels inside the container is solved as well. Bortfeldt and Waschermake review of constraints that may be respected in container loading [1]. In literature, this problem is called truck loading problem. In the scientific literature, there are several papers about the truck

loading problem. Their contents are different from the problems solved in this article. Many of these sources solve the problem of cyclic drives of the trucks loaded with different types of products, e. g. the oil products, so that the time interval between two deliveries is maximal [3]. Another author [2] proposed a way of periodical loading of carriers with more compartments on the load area where the compartments have the various capacity and different types of goods are considered. The three-dimensional packing problem in which rectangular boxes must be effectively placed into containers is presented in [3]. In this paper we review the research focusing on the mathematical models providing the exact solution and heuristic algorithms giving approximate solution.

The problem, that is the subject of this paper, concerns time period  $\langle 1, T \rangle$ , during which the parcels should be loaded into containers with the same capacity  $W$ . We assume that container can be loaded in discrete time  $1, 2, \dots, T$ . No more than one container can be loaded at every time. It is necessary to load the parcels into the container during a given time interval. The size of parcel i.e. occupied part of vehicle's capacity is also known. The aim is to load all parcels when using a minimum number of containers.

## 2 Mathematical Model

Container loading problem concerns time period  $\langle 1, T \rangle$ . Parcel available in time  $i \in I = \{1, 2, \dots, T\}$  should be loaded in time  $i, i+1, \dots, i+d_i$  into the container with capacity  $W$ . Let's denote the size of this parcel  $w_i$  and assume, that  $w_i \leq W$ .

### Parameters of the model are:

$w_i$  size of the parcel, which is available for loading in the time  $i$  and should be loaded in time  $\langle i, i+d_i \rangle$ , where  $i+d_i \leq T$ ,

$W$  capacity of containers.

### Variables of the model are:

$x_{ij}$  binary, equals 1 if the parcel  $i$  is loaded in the time  $j$  into the container,

$y_j$  binary, equals 1 if the container is loaded in the time  $j$ .

### Mathematical model of loading problem (basic model BM)

$$f(y) = \sum_{j=1}^T y_j \rightarrow \min \quad (1)$$

$$\sum_{i=1}^T w_i x_{ij} \leq W y_j, \quad j = 1, 2, \dots, T \quad (2)$$

$$x_{ij} = 0, \quad i = 1, 2, \dots, T, \quad j < i, \quad (3)$$

$$x_{ij} = 0, \quad i = 1, 2, \dots, T, \quad j > \min\{i + d_i, T\}, \quad i = 1, 2, \dots, T \quad (4)$$

$$\sum_{j=1}^T x_{ij} = 1, \quad i = 1, 2, \dots, T \quad (5)$$

$$x_{ij}, y_j \text{ binary}, i, j = 1, 2, \dots, T. \quad (6)$$

The objective function (1) minimizes the number of used containers. Constraint (2) states that the container can't be loaded more than its given capacity. If there is no available container in the time  $j$ , it is not possible to load parcel in this time. Constraints (3) and (4) determine that parcel can't be loaded outside the time interval  $\langle i, i+d_i \rangle$ . Equation (5) assures that every parcel must be loaded.

**Remark.** The solution of the mathematical model concerns the finite time interval. In practice, container loading problem is continuous, thus it goes on to infinity. If we use the solution from the mathematical model, then the parcels available at the end of the interval  $\langle 1, T \rangle$  will require container utilization although its capacity won't be used effectively. It would be appropriate to load these parcels along with parcels that will be available in terms  $T+1, T+2, \dots$ , thereby better utilization of container's capacity will be achieved.

### 3 Infinite Time Interval Problem

Now we will be solving container loading problem in an infinite time interval, thus from 1 to infinity. Parcels which are available in the interval  $\langle T+1, 2T \rangle$  are known at the time  $T$ , parcels which have to be loaded in  $\langle 2T+1, 3T \rangle$  are known at  $2T$ , etc. This continual container loading problem will be solved with a series of models. Let's denote the first of them as first model FM. It is a modified model (1)-(6), which solves the parcels from the interval  $\langle 1, T \rangle$ . Parcels from the interval  $\langle T+1, 2T \rangle$  will be solved by subsequent model SM. We can continue this way forward gradually solving SM models for subsequent intervals.

For simplicity let's assume that  $d_i = 2$  for every  $i$ , thus the interval length within it is possible to load the parcel is 3 time periods, therefore the parcel  $i$  has to be loaded in the time  $i, i+1$  and  $i+2$ .

It is not necessary to load the parcels  $w_{T-1}$  and  $w_T$  in time  $T-1$  or in time  $T$ , it can be loaded later in time  $T+1$  or  $T+2$  respectively. Because of that, we will move the problem of its loading them to the subsequent model SM. Equation (5) won't be valid for these parcels.

#### Mathematical model of the loading problem in the initial time interval (first model FM)

$$f(y) = \sum_{j=1}^T y_j \rightarrow \min \quad (1a)$$

$$\sum_{i=1}^T w_i x_{ij} \leq W y_j, \quad j = 1, 2, \dots, T \quad (2a)$$

$$x_{ij} = 0, \quad i = 1, 2, \dots, T, \quad j < i, \quad (3a)$$

$$x_{ij} = 0, \quad i = 1, 2, \dots, T, \quad j > \min\{i + 2, T\}, \quad i = 1, 2, \dots, T \quad (4a)$$

$$\sum_{j=1}^T x_{ij} = 1, \quad i = 1, 2, \dots, T - 2 \quad (5a)$$

$$x_{ij}, y_j \text{ binary}, i, j = 1, 2, \dots, T. \quad (6a)$$

We obtain optimal solution  $y^*$  and  $x^*$  by solving model FM. Subsequently, we will solve the SM model using available information about parcels from the interval  $\langle T+1, 2T \rangle$  and results from first model FM.

**Mathematical model of the loading problem in the subsequent time interval (subsequent model SM)**

$$f(y) = \sum_{j=T+1}^{2T} y_j + (1 - y_{T-1}^*)y_{T-1} + (1 - y_T^*)y_T \rightarrow \min \quad (1b)$$

$$\sum_{i=T-1}^{2T} w_i x_{ij} \leq W y_j, \quad j = T-1, T, \dots, 2T-2 \quad (2b)$$

$$x_{ij} = 0, \quad i = T-1, T, \dots, 2T, j < i, \quad (3b)$$

$$x_{ij} = 0, \quad i = 1, 2, \dots, T, j > \min\{i + 2, 2T\}, \quad i = T-1, T, \dots, 2T \quad (4b)$$

$$\sum_{j=T-1}^{2T} x_{ij} = 1, \quad i = T-1, T, \dots, 2T-2 \quad (5b)$$

$$x_{ij}, y_j \text{ binary}, i, j = T-1, T, \dots, 2T. \quad (6b)$$

The subsequent model SM can be applied not only for the time interval  $\langle T+1, 2T \rangle$ , but for all subsequent intervals:  $\langle 2T+1, 3T \rangle, \langle 3T+1, 4T \rangle, \dots$

## 4 Numerical Experiments

In the following example, we will illustrate the results from the problem described above. In Table 1 and Table 2 there are requirements  $w_i$  for loading the parcels in time  $1, 2, \dots, 14$ . Requirements in time 13 and 14 are not stated but they can be used for continuation of the task for time 15 and further. The requirement in time  $t$  is placed in the row  $w_t$ . There is only one container available at each time with capacity  $W=10$ . In Table 1, there is a loading time listed for each parcel in rows BMa, FMa and SMa. The letter “L” in rows BMb, FMb and SMb means that a container is loaded in time corresponding the column (time). Number of used container are placed in column  $z$ .

The FMa and FMb rows contains loading times for parcels and containers gained from the FM model in the interval  $\langle 1, 7 \rangle$  and the SMa and SMb rows contain loading times for all parcel and containers gained from using the SM model in the interval  $\langle 5, 12 \rangle$ . For comparison, the standard BM model is used for the whole interval  $\langle 1, 12 \rangle$ .

The results show that FM model uses 2 containers (they are loaded in time 3 and 5) and SM model uses 4 containers (loaded in time 8, 9, 12 and 13). It makes 6 used containers during the whole interval. For comparison, the problem is also solved just with standard BM model on the whole interval  $\langle 1, 12 \rangle$  using the same number of used containers. But this solution contradicts with the assumption that information about parcels from the interval  $\langle 8, 12 \rangle$  is not known until the time 6, thus this solution does not suit the task.



For comparison of the results from FM and SM model (see Table 1), the problem is solved with the fundamental BM model on separate intervals  $\langle 1,7 \rangle$  and  $\langle 8,12 \rangle$ . The result is shown in the Table 2 which indicates that this solution (with 7 used containers) is worse than the solution in the Table 1, where both SM and FM models were used and the parcels from the end of the first interval are loaded in the second interval.

**Table 1.** Results of numerical experiments.

time $t$	1	2	3	4	5	6	7	8	9	10	11	12	13	14	$z$
$w_t$	3	4	2	6	2	7	4	3	6	6	4	6	--	--	
FMa	3	3	3	5	5										
FMb			L		L										2
SMa						8	9	8	9	12	12	13			
SMb								L	L			L	L		4
BMa	3	3	3	5	5	8	9	8	9	11	13	13			
BMb			L		L			L	L		L		L		6

**Table 2.** Results of the based model for separate time intervals.

time $t$	1	2	3	4	5	6	7	8	9	10	11	12	13	14	$z$
$w_t$	3	4	2	6	2	7	4	3	6	6	4	6	1	2	
BMa	3	4	3	4	6	6	7								
BMb			L	L		L	L								4
BMa								9	9	12	12	13			
BMb									L			L	L		3

## 5 Conclusion

This paper deals with container loading problem where parcels need to be loaded in the certain time interval. The aim is to obtain time schedule for loading parcels while minimizing the number of containers.

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## The Issues of Entrepreneurship of Young People - Theoretical Considerations and Empirical Research

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**Abstract.** The problem of entrepreneurship of young people is a very important issue from the point of view of the economy. Young people have untapped potential that could be used for their own benefit and for economic development. It could be the driving force of the processes taking place in society. This is extremely important, especially because with increasing age, the interest in starting own business and the associated high risk is decreasing. The study presents the specificity of entrepreneurship of young people. The authors described attitude of young people to the entrepreneur's career, the motives and their approach to start a business, as well as characterized the impact of education on this process. The authors' presented their own research on the entrepreneurship, carried out using a questionnaire (on paper and electronic versions) conducted among 160 young people – the students of Faculty of Management at Rzeszów University of Technology. It seems that students of such a course should be substantially prepared to run their own company. The Authors of the paper tried to verify this thesis by conducting their own research. Their main aim was to try to answer the following questions: Does (and for how much) establishing own companies is attractive for young people completing their studies in the field of management? Do (and how many) students finishing education have the knowledge necessary in the process of starting a business? Are they theoretically prepared for this? The study also contains a comparison to the results of similar research carried out by one of the authors among the students of Rzeszów University of Technology and young people from Podkarpacie in 2010/2011 (415 people) and in 2012 (150 people). On this basis, it was possible to formulate a number of interesting conclusions referring to a much larger research sample, embedded in a wider time perspective.

**Keywords:** Entrepreneurship, Young People, Academic Entrepreneurship.

## 1 Introduction

Entrepreneurship of young people is becoming a subject of increased importance and interest of the media, politicians and researchers in various fields [5]. Young people have a number of assets that they could take advantage of when running their own businesses. They are open to the new, risks and changes, moreover acquire new ideas and concepts easier. They do not have professional experience, which is negatively assessed, but on the other hand, they have not had the opportunity to fall into routine, what has caused that they are able to better manage in unstable conditions. The privilege of a young age is also energy, dynamism and an optimistic view of the future. Students finishing their studies or graduates are also examples of "people at a crossroads", what can also be an incentive to start own business [2]. Among the key factors adversely affecting the possibility of being an entrepreneur in the case of young people, first of all is the lack of professional experience and (widely understood) life experience [2], which often proves to be very helpful in solving various problems, changes the approach to problems and risks.

Nationwide research carried out in 2017 among 2857 high school students showed that 53.2% of respondents were interested in establishing their own company [5]. The AWMAY Global Entrepreneurship Report from 2013, prepared with cooperation of the Technical University of Munich, showed that over two-thirds (70%) of Poles have a positive attitude towards self-employment. Poles up to the age of 30 are more (81%) positive about entrepreneurship than amounts the average for young people in 24 countries surveyed (77%). Almost every fourth respondent in the world also sees the possibility to start a business [7].

Young people are very positive about entrepreneurship. Their potential should be used, because the interest in establishing their own company (and associated risk) is decreasing with the age. In the group of people over 60, only a little more than half approve entrepreneurship. Among respondents between 30 and 59, this percentage increases to 72%. On the other hand, among people under 30, as many as 81% of respondents think positively about self-employment [7]. This is very important, especially because this does not amount in the actual number of enterprises set up by young people. Frequent reasons are: the fear of failure, financial consequences of bankruptcy, consciousness of lacking sufficient knowledge, and experience which can be useful in the process of launching and running a business. Studies carried out among students of the University of Warsaw show that their ideas about entrepreneurship do not correspond to reality. For example, those who planned the establishment of a company compared the entrepreneur with a sloth who does only what he needs, does not get tired and does not put much effort into what he does. The survey also showed a high degree of dependability and helplessness of future entrepreneurs, for whom the most helpful in running the company would be support from an experienced entrepreneur or an elderly person running his/her own company for years [3]. The young generation is also self-oriented, narcissistic, focused on consumerism. They want to have everything and quickly. Meanwhile, entrepreneurs need discipline and diligence. He/she must often wait patiently for up to several years for success. In

addition, young people have competence deficiencies, which mainly results from the education system [17, 18].

In shaping entrepreneurial attitudes, especially in the case of graduates of various universities, an important role should be that of the academic environments, where students acquire knowledge and establish contacts (which may be useful in the future), to promote the "entrepreneurial spirit". In particular, the students of management should, as it seems, have the knowledge necessary in the process of starting a business. They should be by the academic community "...educated and prepared for economic activity..." [1]. The authors of the study tried to verify this through the implementation of own research carried out among a sample of 160 students of the Faculty of Management at the Rzeszow University of Technology. Their main goal was to seek answers to the following questions: Is starting own companies attractive for young people graduating in the field of management? Do students finishing education have the knowledge necessary in the process of starting a business? Are they theoretically prepared for this?

## 2 Research Assumptions and the Characteristics of the Tested Sample

The aim of the empirical research presented in the study was to obtain answers to the questions whether establishing own companies is attractive for young people graduating from the field of management, and if so, to what extent. In addition, the authors attempted to answer the question whether students finishing education have the knowledge necessary in the process of starting a business, and if so, how useful it is. Answers to these questions were developed on the basis of own research carried out in March 2018 among students of the Faculty of Management at the Rzeszow University of Technology. The total number of questionnaires taken into account in the development of the results amounted 160. The average age of students participating in the study exceeded 21 years (21.7 years). Table 1 contains a detailed description of surveyed sample of young people.

**Table 1.** Structure of the test sample.

Specification	Number of respondents	% of respondents
<i>Sex</i>		
women	113	70.63
men	47	29.37
<i>Place of residence</i>		
village	98	61.25
city up to 20,000 inhab.	12	7.50
city from 20,000 to 50,000 inhab.	6	3.75
city from 50,000 to 100,000 inhab.	15	9.38

city from 100,000 to 500,000 inhab.	28	17.50
city with more than 500,000 inhab.	1	0.63
<i>Source of income</i>		
only on the support of parents	53	33.13
on the support of parents together with independent earning	67	41.88
independent maintenance	40	25.00
<i>Additional education</i>		
no additional education	157	98.13
having additional education	3	1.88

The majority of respondents participating in the study, being over 70%, were women, which results from the specificity of the direction of management, dominated by female students. Study participants lived mainly in rural areas (61.25%) and in a city with a population exceeding 100,000 residents (17.5%). The study was conducted in the city of Rzeszow. One-third of the respondents were solely dependent on their parents. A little over 40% were supported by their parents, but at the same time worked on their own. Only every fourth respondent, at the stage of studying, managed to be financially independent. The vast majority of respondents neither had any additional education nor studied in an additional field; only three declared such education.

### 3 Results of Own Research on Student Entrepreneurship

The vast majority of respondents had experience of paid work or at least search for it (Tab. 2). Less than 30% of respondents declared that they did not have to work, their parents supported them. In the case of over 18% of the respondents, they were looking for a job, but could not find one. Almost one-third of respondents declared that they worked from the very beginning of their studies, although this work was an additional source of their income. At the same time, almost every fifth respondent declared independent living from the beginning of studies, while slightly more than 3% from the last year of their studies.

**Table 2.** Taking up a job while studying.

Have you worked during your studies?	Number of respondents	% of respondents
no - never, but I did not have to	45	28.13
no, although I wanted to, but I could not find a job	30	18.75
yes, practically from the beginning of studies (studying), although, I was not financially independent	50	31.25
yes, practically since the beginning of my studies (studying), I was financially independent	30	18.75

The thought of starting a business was accompanied by over half of the respondents, of which over 14% had thought about it since the stage of a child, and more recently - 37.5%. Almost 1/3 of respondents declared openness to reconsidering the idea, although admitted that they had not thought about this possibility before then 12.5% of students who took part in the study had never taken into account the establishment of their own company. These respondents agreed with the opinion that this is not a good decision for them (taking into account various conditions and self-assessment of their own abilities).

The decision to start a business is not easy, especially for a young person who decides to do it for the first time; it significantly and permanently changes the life of a future entrepreneur [14]. More than 63% of respondents had plans to set up their own business, however only a little over 28% declared the existence of a specific idea. This may indicate the lack of a thorough reflection on the issue of starting a business or the untimely stage of thinking about it (caused, for example, by the need to complete studies). At the same time, the majority of respondents asked how they imagine the path of their professional career in the future, indicated that they would like to run their own business - 58,13% of respondents (Tab. 3). Almost every fourth respondent wanted to work in a small company as an employee, while just over 13% declared willingness to work in a corporation. The least interesting was the idea of going abroad (5%), which in this case should be positively assessed. In this matter, clear improvement can be noticed. Similar research on the attitudes of young people towards entrepreneurship, conducted in 2013 by T. Piecuch and M. Piecuch, showed that as many as 76% of respondents admitted that they were taking a trip abroad to find a job, provide a source of income, become independent from their parents, or to have a family. What's more, the vast majority of them declared their willingness to stay abroad for a long time. It was a characteristic of emigration at that time - mainly educated, young people who did not see the future in the country were leaving. It was not without reason that they were called a "lost generation" [15].

**Table 3.** Employment preferences of young people.

Your future career is:	Number of respondents	% of respondents
working in own company	93	58.13
working in a large corporation	21	13.13
working in a small, private company	38	23.75
departure to work abroad	8	5.00

Analyzing the preferences, respondents were asked about their priorities in relation to their professional career and personal life. Most of the respondents indicated that they would make an effort to reconcile these two spheres, but if necessary will devote a professional career to the family (62.5%). Almost every fourth respondent indicated

that he/she would devote a family life for a career (23.13%). More than every tenth respondent indicated that career is more important, therefore in the near future he/she does not plan to set up a family (11.87%), and only for 2.5% of respondents' family life was more important and these respondents planned to start a family as soon as possible. The presented results may indicate that entrepreneurial orientation is possessed by the surveyed young people, although there is also an awareness of having a balance between personal and professional life. Most of the respondents also indicated that running their own business was primarily a very hard job (50.62%), afterwards - independence (11.87%) and contentment and satisfaction (5.65%). To a lesser extent, they pointed to the prestige and respect stemming from running their own business (3.13%) or for big money (1.25%). The vast majority of the respondents (27.5%) indicated, however, that all these factors may influence the higher assessment of running a company and its advantage over the work for "someone else", or full-time. This is also confirmed by the results of foreign surveys [8, 10].

Over 67% of respondents declared having entrepreneurial characteristics. Among the most frequently cited answers were: creativity (16.44% of respondents declaring having entrepreneurial features indicated it), ambition (7.38%), organization (6.7%), willingness to take risks (6.04%), openness (5, 36%), the ability to plan and manage time (5.03%), communicativeness (4.36%), courage (4.02%), responsibility (3.35%).

In the opinion of more than half of respondents, the knowledge gained during the studies, both theoretical and practical, will be useful to them in running a business (51.88%). The usefulness of the theory was declared by over 21% of respondents, and the usefulness of the acquired practice by 10.6%. This may suggest a lack of practical knowledge in the process of educating future entrepreneurs, although the respondents themselves claimed that their studies prepared them for running a company (65%). At the same time, the results of some surveys indicate that education in this area is conducive to shaping entrepreneurial characteristics [16]. Additionally, there are opinions that management courses do not affect the decision to start a business [6].

Over 66% of respondents declared knowing the procedures related to setting up a business, although every third respondent gained knowledge of this subject during training. The remaining part obtained it by themselves (34%) or found that they did not possess it (33.7%). This results from the fact that studies in the field of management have had only some impact on the willingness to run an own business. Some studies draw attention to the need to start entrepreneurship education earlier or conduct it as lifelong learning or incorporating it into other subjects [13] [4], although there are also different voices questioning the legitimacy of teaching entrepreneurship [12].

For the majority of respondents, the studies were only the final argument convincing to this form of professional activity, but they did not have a key impact (66.88%). The impact of studies on the decision to find a company was declared by less than every tenth respondent (9.37%).

The main reasons why respondents were determined to start their own business were: independence (20.87%), self-fulfillment (17.30) and financial issues, which were indicated by only 13% of respondents. It may be surprising, because it is known that profit, especially for young people, should be one of the most important motivations for setting up companies (Tab. 4).



**Table 4.** The motives for starting a business or its lack.

The motives for starting a business	The motives for not starting a business
- independence (20.87%)	- lack of initial capital (22.89%)
- willingness to self-fulfilment (17.30%)	- too much paperwork, bureaucracy, too many problems and duties (21.69%)
- money (12.92%)	- too much risk (21.08%)
- willingness to prove that you will succeed (12.13%)	- lack of predisposition (15.06%)
- prestige and respect due to the company (8.75%)	- lack of people management skills, shyness, closure (9.04%)
- having the right predispositions for being an entrepreneur (6.96%)	- faith in finding a well-paid job (7.23%)
- having a good business idea (4.77%)	- faith in another way of managing life (2.41%)
- family example (3.78%)	- other reasons (1.81%)
- power and the ability to influence others (3.58%)	
- necessity of life (3.18%)	
- example of colleagues who have succeeded (2.39%)	
- willingness to use capital (2.19%)	
- taking over the company after parents (0.99%)	
- other reasons (0.38%)	

The respondents' reasons for not wanting to set up companies primarily included: financial issues related to the lack of initial capital, too much formality and risk, and lack of predisposition to run the company.

In addition to the data presented in the study, T. Piecuch conducted similar research on the attitudes of young people towards entrepreneurship at the turn of 2010 and 2011, and in 2012. The survey questionnaires used by her were not identical in each year, but the results on certain issues can be compared (included in Tab. 5).

**Table 5.** The motives for starting a business or not – results from previous researches.

Research aspects	Research from 2010/2011 and 2012	Research from 2018
Sample size	- 415 (2010/2011) - 150 (2012)	160
Research sample	- the students of the Faculty of Management and Marketing at the Rzeszow University of Technology (2010/2011) - young people from Podkarpackie Voivodship (2012)	the students of the Faculty of Management at the Rzeszow University of Technology
The most important motives for setting up business	Research from 2010/2011: - profit - the will to prove to others that I can handle it - possessed predispositions	- independence - self-realization - profit

The willingness to start own business*	- 50% (2010/2011) - 43% (2012)	58%
The percentage of people who do not plan to set up a business	3.2% (2010/2011)	12.5%
The attractiveness of working in a corporation	26.8% (2010/2011)	13.1%
The willingness to emigrate	76% (2012)	5%

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Trying to compare the results from research in particular years on the area of young people entrepreneurship, a clear difference in the motives for starting a business can be observed. In research from 2018, 'profit' significantly decreased as the most important reason for students in the establishment of companies, in favor of 'self-fulfillment', which only one researched person pointed out in 2010/2011, and 'independence', important only for 6 people (1.45% of the research sample). Such a situation may be the result of the fact that this year's respondents are representatives of another generation - this is the Z generation, for which independence and self-fulfillment (the possibility of implementing interesting tasks, continuous development) are extremely important. Interestingly, corporations perceived as very difficult work environments, are becoming increasingly attractive to young people, which on the one hand offer a lot, but on the other still require more. Representatives of the Z generation are individualists (often even egoists) who are difficult to submit to, and work in a corporation that is mainly based on teamwork, requires cooperation with others, and sharing knowledge and information - hence perhaps such a distribution of answers among respondents. It is comforting to think that very few young people (compared to 2012) now declare their willingness to go abroad for work. Even if they take this into account, these are mainly short-term trips or holidays with the declaration to return back home and look for a good, satisfying job.

## 4 Conclusion

Many spectacular successes of young people worldwide confirm the thesis that it is possible to pursue business activity regardless the age. This should be an example for those who are not convinced of what they should (want to) do. Such instances of brilliant careers should be treated as inspiration and motivation to change one's professional situation.

There is undoubtedly enormous potential in young people that needs to be used. In order to encourage them to set up their own businesses they should be provided with financial help from the state in the form of, for example, loans for starting a business, and access to education on entrepreneurship. Unfortunately, as the authors' own studies

\* A similar percentage of respondents in Lithuanian research declared their willingness or even taking their first steps in establishing a company [11].

have shown, even studies in the field of management (which should provide knowledge about the various conditions of launching and running a business) do not prepare adequately enough to start companies, especially do not provide the practical knowledge, which would be expected the most by the young people. In some cases, studying at university provided the final argument, but in fact did not significantly contribute to changing attitudes of young people to more entrepreneurial ones. Although for many of them being an entrepreneur is an attractive path in their own professional career, in many cases the fear of failure blocks their youthful enthusiasm.

Comparing the researches on the attitudes of young people towards entrepreneurship implemented in 2010/2011, 2012 and 2018, it can be concluded that there is a certain difference in the respondents' approach to entrepreneurship. This probably results from the fact that the Z generation is now entering the labor market, for which other values are important in life, and they approach work, leisure, entrepreneurship, etc. in a different way.

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## The Development of Organic Farming in Poland and the Czech Republic - the Scope and Directions of Changes

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**Abstract.** Organic farming is an agricultural production system aimed at sustainable production, in particular maintaining and strengthening the health of ecosystems and organisms. This paper presents analysis in the area of directions of changes and assessment of the state of development of organic farming in Poland and the Czech Republic in the years 2004-2016. The area of ecological agricultural land, both in Poland and the Czech Republic, in 2016 was over 500,000 ha. This shows a high level of development of this production. In the period 2004-2014, the area of ecological crops in Poland increased more than six fold. However, during the analysed period, various trends in the development of organic farming in Poland and the Czech Republic were noted. In recent years, in Poland, despite the high potential, the number of farms and the area of ecological arable land have been decreasing. In the Czech Republic, the situation is stable. In both countries there is also strong internal differentiation of the development level of organic farming in the arrangement of individual regions. The article uses statistical data included in statistical yearbooks and reports published, among others, by the Central Statistical Office in Poland and the Ministry of Agriculture in the Czech Republic.

**Keywords:** Organic Farming, Poland, Czech Republic, Agriculture Sustainable Development.

### 1 Introduction

Securing food needs, the basic task of the agricultural sector, can be implemented in various management systems. Today, three main agricultural management systems are distinguished: conventional, ecological and integrated [23]. One of the main criteria for the division presented above is the degree of dependence of agriculture on industrial means of production and the impact of the method of managing agricultural space (in the scope of crops and animal production as well as their processing) on the natural environment. The subject of this article refers to the ecological system, which, due to its role in environmental protection, preservation of biodiversity, sustainable use of

natural resources, is an important element of shaping low-emission farming [11,17,19]. Organic farming is a way of farming that minimizes the adverse impact on the natural environment (prohibition of using synthetic chemical means of agricultural production). This is the management in accordance with natural processes occurring in nature, which do not disturb ecological balance. It is worth noting, however, that agricultural production, unlike other areas of economic activity, is always connected with the natural environment and with natural conditions.

This article attempts to analyse the field of changes in the number and area of crops in organic farming of two countries - Poland and the Czech Republic. Organic farming began to develop in Poland in the early 1990s [3]. Before that time, the ecological farming management system in Poland, in the conditions of chronic shortage of goods on the agri-food market, did not play a major role. An important date in the history of development of this form of farming in Poland was 1989, when the first organization dealing with organic farming was established in Poland (Ekoland Association), which was at the time the first certification body [12]. The time of emergence of ecological farming in the Czech Republic was similar. The beginning of its expansion took place after the political change in 1990 [20]. The scope of organic farming, in relation to the area of cultivation and the scale of farming, significantly expanded in the Czech Republic after 1997 [10].

Due to the higher labour inputs, unit costs of organic production are much higher than in the conventional production system. The use of natural substances and processes occurring in nature, in the absence of chemical means of agricultural production, results in lower efficiency of agricultural production in the ecological system than the conventional one. An important instrument for supporting organic farming is the system of subsidies for production, intended to cover additional costs and compensate for lost income. Financial support for ecological farms in Poland and the Czech Republic before accession to the European Union was implemented from national programs (e.g. subsidies for farm control costs), while after accession, under the Common Agricultural Policy, farmers receive direct payments. In Poland, organic farming received financial support from the state budget for the first time in 1998. Since Poland's accession to the EU, financial support for organic production comes from two sources: the national budget and the EU budget [7]. Organic farming in the EU is a highly complex and dynamic food system [1]. Selected numerical data and indicators regarding organic farming in Europe and the European Union are presented in Tab. 1.

**Table 1.** Organic farming in Europe and the European Union in numbers (data of 2015) [21].

Indicator	Europe	European Union	Top countries
Organic farmland	12.7 million ha	11.2 million ha	Spain, Italy, France
Organic share of total farmland	2.5%	6.2%	Liechtenstein, Austria, Sweden
Producers	349 261	269 453	Turkey, Italy, Spain
Importers	3 681	3 474	Germany, Netherlands, Italy
Retail sales	29.8 billion euros	27.1 billion euros	Germany, France, United Kingdom

In the European Union, organic farming is considered only the type that meets the conditions contained in the Council Regulation (EC) No. 834/2007 [2]. Of all EU countries, the largest area of organic farming occurs in Spain, Italy, France and Germany. Among the new Member States from Central and Eastern Europe in the European Union, the largest area of organic farms is recorded in Poland and in the Czech Republic. Accession to the European Union enabled the members to join the common market and influenced the development of the agri-food sector in the studied area, including organic farming [5, 8].

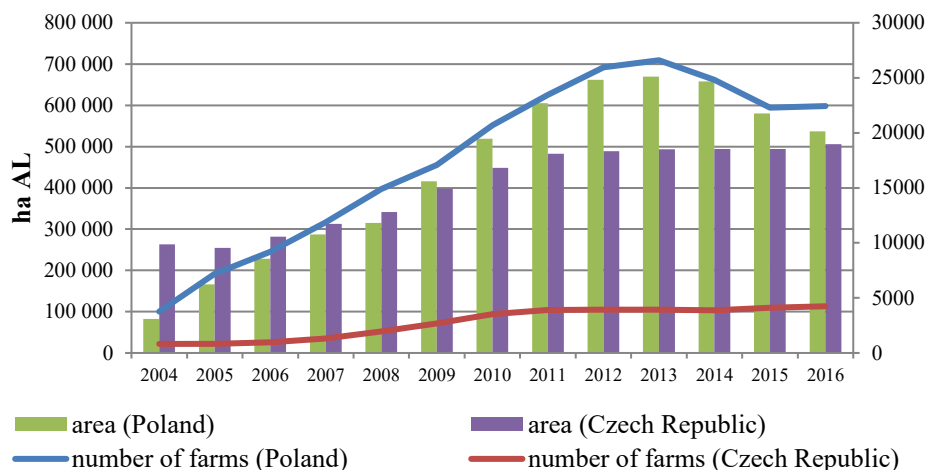
## 2 Purpose, Methodology and Sources of Information

The aim of the article is to present the directions of changes and assessment of the state of development in the field of organic farming in Poland and the Czech Republic. The analysis included diversification in the number and area of organic farms. The basic time range of analyses covered the years 2004-2016. Additionally, the state of organic farming development in the analysed countries was presented in regional approach (as of 2016). The empirical part of the work was based on a quantitative analysis of data obtained from secondary sources - studies of the Central Statistical Office in Poland and the Ministry of Agriculture in the Czech Republic.

## 3 The Process of Ecologisation and the Current State of Polish and Czech Organic Farming after Accession to the European Union

Thanks to the implementation of subsidies under the agri-environmental program, in Poland in the first years of membership in the European Union, dynamic development of organic farming was recorded. In the Czech Republic, a high growth rate has been

recorded since 1998, and in 2004, the area of ecological arable land was 263 299 ha. In Poland in 2004, this area amounted to only 82 729.5 ha (Fig. 1).



**Fig. 1.** The number of farms carrying out production with the use of ecological methods and area of ecological arable lands in Poland and Czech Republic in 2004-2016 [4, 18, 22].

In 2016, the area of ecological arable land in Poland amounted to 536,579 ha (including 105 683 ha in the conversion period). In turn, in the Czech Republic, the area of agricultural land in organic farms in 2016 amounted in total 506 079 ha, including 62 473 ha in the conversion period [4, 22].

In the years 2004-2016, the number of organic agricultural producers in Poland increased by 18 675 farms. According to statistical data, due to the high growth rate of the number and area of organic crops in Poland, in 2009 the total area of arable land for organic farming in Poland was higher than the corresponding area in the Czech Republic. A characteristic feature is the relatively constant, unchanging level of the number of organic farms and area in the Czech Republic in 2011-2016. It may seem that the ecological system of agricultural production in the Czech Republic shows saturation characteristics, and the further development of the scale of primary (agricultural) production is conditioned by the increase in internal demand for organic products and the development of exports in this respect. On the other hand, in Poland, a rapid increase in the number of farms using ecological methods in the cultivation of plants and animal husbandry which took place in 2004-2012 abated and in 2014-2016 a downward trend in the studied area was noted. In the subject literature, it is emphasized that the high dynamics of growth mainly concerned horticulture and newly established large-area walnut, hazelnuts, as well as blueberries plantations [6]. It was also problematic to legally subsidize unused permanent pastures and orchards as part of the implementation of organic farming packages [13]. In the new financial perspective (2014-2020), abuses in this area have been significantly reduced.



There is no doubt that financial support for organic farming after Poland's accession to the European Union contributed mainly to the dynamic development of this system of agricultural production in 2004-2012. Favourable factors were the very large potential resulting from natural resources (area of arable land) and lower specialization and concentration. Comparative analyses of the diversification of the agrarian structure and productivity of land and labour in the Visegrad Group countries are presented in the literature on the subject [16]. Relatively lower subsidies for organic farming in Poland in the new financial perspective (2014-2020) than in the years 2007-2013 contribute to the decline in the number of organic farms (as well as the area of ecological land).

An interesting research problem related to organic farming is the analysis of its aspects concerning the location of farms [14,15]. Agricultural production carried out using ecological methods and areas for ecological cultivation are not evenly distributed in Poland and the Czech Republic (Tab. 2 and 3).

**Table 2.** Organic farms land according to land use compared to total acreage in regions of Poland in 2016 [18,22].

Specification	Number of organic farms	Total organic acreage	Share of organic farms land in total agricultural land
		[ha]	[%]
Dolnośląskie	813	29 200	3.2
Kujawsko-pomorskie	470	9 263	0.9
Lubelskie	1 980	31 343	2.2
Lubuskie	1 148	43 234	10.8
Łódzkie	497	9 986	1.0
Małopolskie	1 093	12 364	2.2
Mazowieckie	2 426	49 517	2.6
Opolskie	68	3 217	0,6
Podkarpackie	1 252	15 485	2.6
Podlaskie	3 437	55 168	5.0
Pomorskie	679	23 328	3.2
Śląskie	180	5 325	1.4
Świętokrzyskie	834	10 739	2.,2
Warmińsko-mazurskie	4 142	108 667	10.6
Wielkopolskie	843	29 171	1.7
Zachodnio-pomorskie	2 573	100 570	11.8
<b>Total</b>	<b>22 435</b>	<b>536 579</b>	<b>3.7</b>

Of all voivodships in Poland in 2016, the largest number of organic agricultural producers used land in Warmińsko-Mazurskie (4 142), Podlaskie (3 437) and

Zachodniopomorskie (2 573) voivodeships. It is worth emphasizing that in these three voivodeships, 45.3% of all organic agricultural producers in Poland were found. The highest share of the area of organic farming in the structure of agricultural area in individual voivodeships was recorded in Zachodniopomorskie, Lubuskie and Warmińsko-Mazurskie voivodeships. On the other hand, the lowest number of ecological farms in Poland in 2016 was recorded in Opolskie voivodeship. In this voivodeship in Poland, very intensive agricultural production is conducted. Agricultural production using ecological methods is not evenly distributed in the Czech Republic either (Tab. 3).

**Table 3.** Organic farms land according to land use compared to total acreage in regions of Czech Republic in 2016 [4].

Specification	Number of organic farms	Total organic acreage	Share of organic farms land in total agricultural land
		[ha]	[%]
Karlovy Vary	223	54 056	43.6
Liberec	260	34 130	24.5
Moravia-Silesia	390	55 265	20.2
Zlín	370	36 838	19.1
Ústí nad Labem	295	46 852	17.0
South Bohemia	624	75 309	15.4
Pilsen	475	58 072	15.4
Olomouc	256	37 237	13.4
Hradec Králové	225	22 802	8.2
Pardubice	169	14 255	5.3
Vysočina	347	19 488	4.8
South Moravia	301	18 219	4.3
Central Bohemia	295	18 359	2.8
Prague	13	79	0.4
<b>Total</b>	<b>4243</b>	<b>490 960</b>	<b>11.7</b>

In spatial terms, particularly strong development of organic farming in the Czech Republic is recorded in the region of Karlove Vary (223 agricultural holdings with a total area of 54 056 ha, which accounts for 43.6% of agricultural land in this region). In 2016, in the Czech Republic, the largest number of organic farms was recorded in the South Bohemia region (624 farms), the largest area of ecological arable land in the field of research (75 309 ha) was also recorded in this region.

As it was mentioned earlier, subsidies are an important element conditioning the development of organic farming. In Poland and the Czech Republic, the rates depend on whether agricultural crops are in the conversion period (i.e. conversion to organic

farming) or after conversion. The current subsidy rates (in the financial perspective 2014-2020) are presented in Tab. 4 and 5. In the 2014-2020 financial perspective, 12 packages with differentiated ecological payment rates were identified in Poland (Tab. 4).

**Table 4.** Ecological payment rates in Poland in the financial perspective 2014-2020 [9].

<b>Package</b>	<b>Variant</b>	<b>Payment rate (PLN/ha)</b>
Package 1. Agricultural crops in the conversion period		966
Package 2. Vegetable crops in the conversion period		1 557
Package 3. Herbal crops in the conversion period		1 325
Package 4. Orchard crops in the conversion period	4.1.1. Basic orchard crops in the conversion period	1 882
	4.1.2. Berry crops in the conversion period	
	4.2. Extensive orchard crops in the conversion period	790
Package 5. Forage crops in arable lands in the conversion period		787
Package 6. Permanent pastures in the conversion period		428
Package 7. Agricultural crops after the conversion period		792
Package 8. Vegetable crops after the conversion period		1 310
Package 9. Herbal crops after the conversion period		1 325
Package 10. Orchard crops after the conversion period	10.1.1. Basic orchard crops after the conversion period	1 501
	10.1.2. Berry crops after the conversion period	
	10.2. Extensive orchard crops after the conversion period	660
Package 11. Forage crops in arable lands after the conversion period		559
Package 12. Permanent pastures after the conversion period		428

In Poland, the ecological payment may be granted to the area of organic farming, and under the measure of "Organic farming", an agricultural producer may undertake obligations in the scope of:

- crops on arable land: agricultural, vegetable, herbal, forage and berry,
- orchard crops,
- permanent pastures.

Current rates of payments for agricultural organic producers in the Czech Republic are presented in Tab. 5.

**Table 5.** Payment rates in organic farming in the Czech Republic [4].

Land use	Subsidies for	Amount of payment (EUR/ha)	
		2016 (conversion period)	2016 (under OF system)
Permanent grassland	Permanent grassland*	84	83
Arable land	Growing vegetables or special herbs	536	466
	Growing strawberries	669	583
	Growing grass for seed	265	180
	Growing other crops	245	180
	Grassland on arable land	79	69
	Fallow land	34	29
Permanent crops	Orchards – intensive	825	779
	Orchards – others	424	424
	Vineyards	900	845
	Hop-fields	900	845
	Other permanent crops – landscape orchards	165	165

\* The higher per-hectare payment for permanent grassland (89 EUR/ha) applied in 2014 had been established since 2008 for organic farms managing all areas in organic farming. i.e. without parallel conventional areas.

The detailed conditions for the provision of subsidies to organic farming in Czech Republic are stated in Government Regulation No. 76/2015 Coll., on conditions for carrying out “Organic Agriculture” measure. Specific sum to be paid in Czech Crowns varies from year to year depending on the current exchange rate. In 2016, the exchange rate was 27,023 CZK/EUR. In 2016, 3 862 applications were submitted in support (farmers applied for nearly 1 332 million CZK) [4].

## Conclusion

In the years 2004-2016, both the number of ecological farms and the area of ecological arable land in Poland and the Czech Republic increased, which proves the development of the organic production sector. However, the dynamics of changes in this area was different. In Poland, the number of organic farms increased over this period by 18 675 farms, and in the Czech Republic by 3 407. In the years 2004-2016, the area of ecological arable land in Poland increased by 453 850 ha (in the Czech Republic by 242 771 ha). It is observed in Poland a decrease in the area of organic agricultural land from 2014. Financial support for organic farming after Poland's accession to the EU contributed to the dynamic development of this system of agricultural production, especially in the years 2004-2012. Both in Poland and in the Czech Republic, significant territorial diversification of the development of organic farming is observed.

The major difference in organic farming in Poland in relation to the Czech Republic is the size of farms implementing this production system. The ecological farming system in Poland is implemented mainly by farmers owning small, traditional, low-cost agricultural holdings. In turn, in the Czech Republic, like in the whole agriculture, these are large-scale farms.

Further development of organic farming in Poland and the Czech Republic depends on the market demand for goods supplied by ecological farms. This is related to both changes in the structure of internal consumption (including changes in consumer attitudes) and the situation on the market of organic products in the European Union. The financial conditions are also important, especially the level and scope of direct payments to farmers for the area of organic farming. There are significant differences in this respect between the countries surveyed, not only in the amount, but also the subject of these payments.

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## **Systems and Tools for Supporting Farmers' Decisions Regarding the use of Agrochemicals in Poland**

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**Abstract.** Poland currently belongs to countries with a relatively high consumption of agrochemicals, in particular mineral fertilizers and chemical herbicides. From the perspective of environmental protection, as well as improving the efficiency of treatments using agrochemicals, it is essential for the farmer to have knowledge in order to make the right decisions. To meet these needs, Decision Support Systems, IT tools providing information and knowledge, supporting organizational and business decision-making activities are created. This paper presents the results of analyses of the use of these systems in Poland. The work also presents innovative decision support systems in the form of applications as well as statistical data on the current level of agrochemical consumption in Polish agriculture. According to the analyses, Polish farmers have access to many systems, including innovative ones. Statistical data shows that users of farms in Poland only to a small extent use the decision-making support of in the field of plant protection. In this respect, it is necessary to increase the activity of farmers in the search for knowledge from many different sources and to significantly increase its level and improve their skills.

**Keywords:** Mineral Fertilization, Use of Plant Protection Products, Decision Support Systems, Decision Support Tools, Poland.

### **1 Introduction**

In many areas of the economy, decision support systems have been used for more than 40 years and they have been present in the agricultural sector for over 30 years. During this period, decision support systems in agriculture went through the phases of unbelief, euphoria and disappointment, to the stage of maturity with realistic, potential impact [10]. There is also no doubt that farmers need more and more information to develop task plans that meet economic and environmental goals. The scope of input data for analyses performed on a farm is very large, and the complexity of problems at the interface between economy and environment in agriculture causes problems with verification of information and selection of optimal solutions from the economic and ecological point of view. Decision support systems in agriculture are a factor contributing to the implementation of a viable farming economy with a lower negative impact on the environment. In particular, it is important to provide farmers with up-to-date and relevant information [8]. To be applied in practice, the designed systems must

be assessed by farmers as useful tools for accessing information and advice in agricultural systems. Promptness and reliability of the systems are also important.

Decision support systems are an important factor in improving organizational and business processes in farm management, especially in the area of improving productivity and environmental performance [15, 17]. For farmers and agricultural advisors, support systems and tools can facilitate effective management of an agricultural holding through effective data recording, analysing it and generating practical recommendations [16]. This applies, among others, to the use of agrochemicals, including plant protection products and mineral fertilizers. Currently, systems in this area are designed and modernized in many countries. For example, the Swedish project for the development of the agricultural decision support system (AgriDSS) for nitrogen fertilization is currently being carried out [9]. Activities in this area are undertaken in most countries by both public institutions and business entities.

The main purpose of this work is to show the degree of use of Decision Support Systems in the area of fertilization and plant protection in Poland. In addition, the work presents, i.a. innovative decision support systems in the form of applications, as well as statistical data on the current level of fertilization and pesticide use in Poland.

## **2 Methods and Sources of Materials**

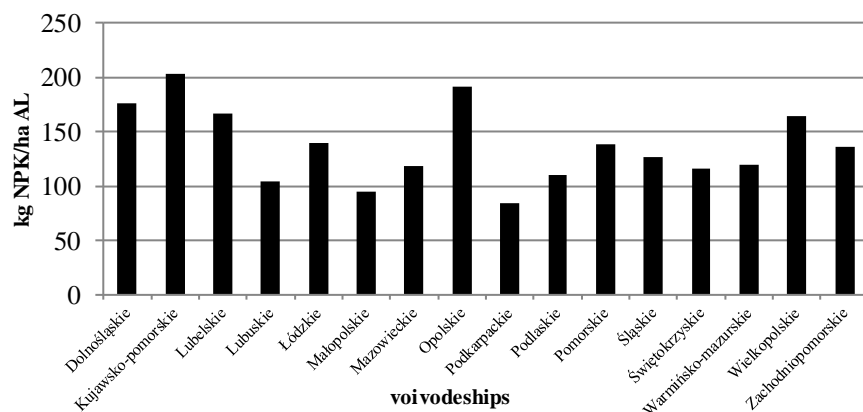
The article uses primary and secondary sources of information. In the field of primary sources, the results of a survey conducted by the author of work among 431 farms in Poland (from dolnośląskie and opolskie voivodeships with relatively high consumption of agrochemicals in Poland) were presented, in which pesticides were used in 2010-2015. A random selection was used. Empirical research was carried out in cooperation with Agricultural Advisory Centres. The research was representative in nature. Secondary sources of information, apart from literature on the subject, included also statistical data published by the Central Statistical Office (GUS). Due to the range of data available in the statistical sources, particular attention was paid to the area of pesticide use. Among the research methods used, the questionnaire method and market observation should be mentioned. All the considerations were based on extensive factual materials coming both from primary sources (surveys) and secondary ones.

## **3 Consumption of Agrochemicals in Poland and Decision Support Systems Used in this Field**

According to the GUS data, in the 2016/2017 marketing year, fertilizer consumption amounted to 140.4 kg NPK/ha agricultural land, i.e. 5.6% more than in the 2015/16 season. In international statistics, the level of fertilizer consumption in Poland in the 2015/16 season was the third highest in the European Union (after Belgium/Luxembourg and Germany, and before the Netherlands and the Czech Republic). In some regions of Poland (mainly in the kujawsko-pomorskie, opolskie and dolnośląskie voivodeships) the applied fertilizers exceed the average level of



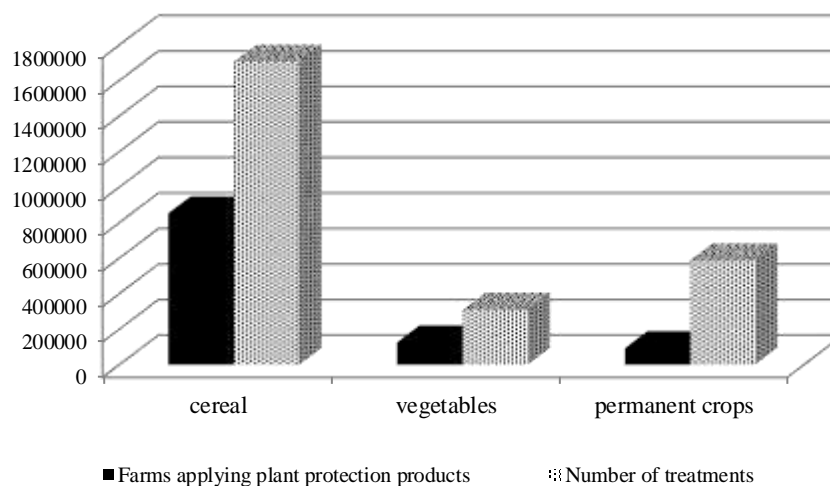
consumption in the countries with the highest level of fertilization in European Union [14]. The fertilizer use structure in Poland is dominated by Nitrogen fertilizers (in the 2016/17 season they constituted 56.1% of total consumption) [19]. It is worth emphasizing that in Poland there is significant regional differentiation in the level of fertilization, which is related to the variability of the crop structure, applied technologies and agricultural techniques (Fig. 1).



**Fig. 1.** Level of mineral fertilization (in terms of pure component) in Poland in farming year 2016/2017 [4].

According to GUS data, in two voivodeships the fertilization level was very high in the 2016/2017 season (in the Opole voivodeship it amounted to 190.7 kg NPK/ha of agricultural land, and in the Zachodniopomorskie voivodeship it was 202.5 kg NPK/ha). The lowest level of fertilization was recorded in the Małopolskie voivodeship (94.9 kg NPK / ha of agricultural land).

Considering the consumption of plant protection products, Poland is not a leader in the level of their consumption in Europe. The level of consumption of the active substance per 1 ha of arable land and permanent crops in Poland in 2016 amounted to 2.2 kg. Considerably greater consumption is recorded in the Netherlands (over 9 kg / ha), Italy, Portugal, Germany and Slovakia. Nevertheless, in Poland a relatively large amount of herbicidal products is used and the level of their consumption is one of the highest in Europe [11,14]. According to GUS data, the scale of utilization of plant protection products in agricultural holdings in Poland is very large (Fig. 2).



**Fig. 2.** Treatments with plant protection products conducted on farms in Poland in farming year 2016/2017 [4].

In Poland, since the beginning of the present decade, the consumption of plant protection products has been showing increasing tendency. These issues, especially in the economic and ecological context, are frequently the subject of analyses in the subject literature [1, 11, 13, 18, 20].

Agro-technical treatments using agrochemicals, both fertilizers and pesticides, are difficult. Certainly, the difficulty does not consist in conducting the treatment itself (e.g. spraying) but in making a decision about the procedure and proper selection of technical means. As far as fertilization is concerned, knowledge of soil abundance and the ability of plants to take up nutrients is significant. In turn, in terms of pesticides, the scale of pest risk is important, including the economic thresholds of harmfulness. It is also necessary to maintain optimal conditions during the procedure (temperature, wind strength, etc.). Due to all these factors, systems that will assist farmers in deciding whether to perform the procedure may be useful to them. The systems may also support the selection of a specific technical measure, the use of which is optimal in given economic and agri-environmental conditions.

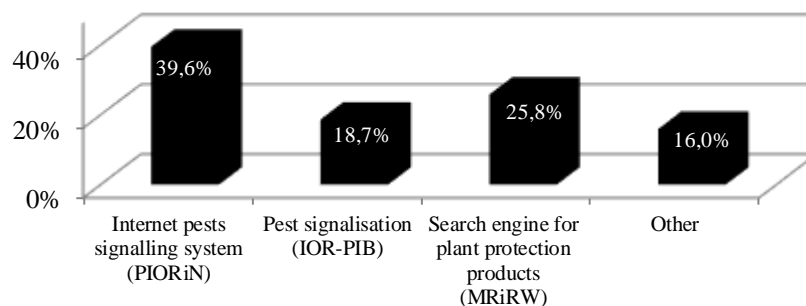
According to statistical data, 339 486 farms in Poland used support in decision making in the field of plant protection in the 2016/2017 marketing year. The most popular forms of support were personal consultancy and thresholds of economic harmfulness. The results of statistical surveys in this area are presented in tab. 1. It also shows the number of users benefiting from support in making plant protection decisions in individual voivodeships in Poland. Statistical sources do not contain information on systems in the field of fertilization; hence these systems are omitted in this part of the article.

**Table 1.** Farmers using assistance in the making of decisions in plant protection in Poland in farming year 2016/2017 [4].

<i>Voivodships</i>	<i>Total</i>	<i>Advisory personnel</i>	<i>Support system in plant protection decision</i>	<i>Thresholds of economic harm</i>	<i>Monitoring of harmful organisms</i>	<i>Other sources of advisory</i>
<i>in absolute numbers</i>						
Dolnośląskie	18078	11226	6844	10105	7023	10961
Kujawsko-pomorskie	24371	16818	8434	15253	8592	12805
Lubelskie	48452	31008	14669	27107	22868	25159
Lubuskie	4849	2892	1646	2907	1388	3128
Łódzkie	31282	19044	9499	17233	9067	17088
Małopolskie	24438	17817	9470	14654	6904	13946
Mazowieckie	45666	31547	15949	27012	16612	23114
Opolskie	13658	10119	4353	5850	3892	7055
Podkarpackie	20531	14606	5680	9933	6673	11301
Podlaskie	11995	8393	3688	5167	2939	5454
Pomorskie	10279	7854	3177	4711	3234	4509
Śląskie	10040	7322	3215	5954	2601	3826
Świętokrzyskie	18758	12024	6869	8756	5590	10001
Warmińsko-mazurskie	10199	7293	3719	5852	4196	5512
Wielkopolskie	39604	28594	16499	24153	13959	21875
Zachodniopomorskie	7286	5083	2598	4089	2549	3825
<b>Total</b>	<b>339486</b>	<b>231640</b>	<b>116308</b>	<b>188737</b>	<b>118086</b>	<b>179559</b>

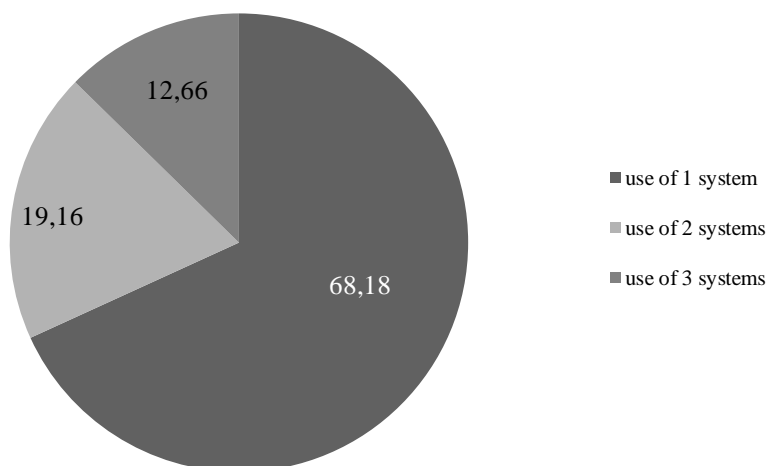
In terms of voivodships, the largest number of users using support services in the studied area was recorded in the Lubelskie, Mazowieckie and Wielkopolskie voivodships. Against the background of the statistics presented above, the data from own research showing the sources of support in the studied area are presented below.

As presented in the research methodology, these are the results of analyses on a representative group of farmers from the Dolnośląskie and Opolskie voivodships (ie voivodships with a relatively high consumption of agrochemicals in Poland). According to own research, 71.5% of farmers declared the use of support systems. Fig. 3 presents decision support systems in the field of plant protection used by the respondents.



**Fig. 3.** Decision support systems in the field of plant protection used by the respondents.

According to the analyses, the most frequently mentioned system of support in the field of plant protection was the Internet pests signalling system (PIORiN), followed by the search engine for plant protection products (MRiRW) and pest signalisation (IOR-PIB). Responses in this area concerned individual advice provided by institutions (e.g. agricultural advisory centres) or economic entities selling agrochemicals. Most of the 308 farmers benefiting from support systems chose one system to support their decisions regarding the use of pesticides (Fig. 4).



**Fig. 4.** Structure of users in terms of number of systems used on farms [%].

According to analyses, relatively few farmers diversify sources of knowledge and use 2 or 3 systems simultaneously.

In the research, farmers mentioned systems popular in Poland, ie the Internet system of pests signalling (PIORiN), the search engine for plant protection products (MRiRW) and the signalling of pests (IOR-PIB). A description of these systems is presented in other works of the author of this article [11,12]. It is worth emphasizing here that innovative systems, described below, are currently being developed in Poland.

According to analyzes, relatively few farmers diversify sources of knowledge and use 2 and 3 systems together.

The results of own studies of the author have clearly indicated that many farmers do not calculate the costs of plant protection treatments (both at the level of agricultural holdings and individual crops). The analyses of costs and profitability of protective treatments provide a basis for a rational use of the factors of production. There is also a problem of insufficient knowledge and professional skills of agricultural producers, while the importance of this problem may grow up along with the increase in the level of product innovation in the sphere of pesticides and technical equipment for their application. The ignorance in this scope may be accompanied by insufficient care of the quality of the protective treatments performed. This intensifies the educational and training needs [11]. ICTs are most useful to benefit education.

#### **4 Innovations in the Studied Area and their Potential**

As in other areas of human activity, also in the field of support systems' design, we deal with progress and the introduction of innovative solutions. Innovations concern, among other things, the sources of information, methods and ways of analysis and presentation of results. Some examples of such activities undertaken on the Polish market are presented below.

In the field of mineral fertilization, SatAgro web application is an innovative solution (Fig. 5). The application enables automatic processing of satellite data for monitoring individual arable fields and creating electronic dosing instructions for fertilizers (mainly nitrogenous). In the authors' assessments, the use of information on the crop growth phase and the suggested dose of fertilizer enables saving from a few to a dozen or so percent of the fertilizer per hectare of farming area. It is worth noting that the technology provides direct access to NASA satellite observations, the European Space Agency and the European Commission (Copernicus program), as well as private operators. Thanks to the SatAgro application it is possible to monitor the development of crops, observe the effects of weather and agronomic operations, as well as draw conclusions from historical data [7].



**Fig. 5.** SatAgro web application [5].

The Polish start-up, SatAgro, was created with the significant participation of Grupa Azoty, the largest Polish producer of mineral fertilizers [13]. The company occupies the second position in the European Union in the production of nitrogen and multi-component fertilizers. The device that optimizes fertilization is also the N-sensor. In this case, nitrogen fertilization is optimized depending on the condition and potential of the plantation and the state of their nutritional status (deficiency or excess of nitrogen is shown by the variable colour of the leaves). There are many products of this type; one of options available on the Polish market is CLAAS SENSOR ISARIA by CLAAS. CROP SENSOR is a tool for optimal application of not only nitrogen fertilizers and growth regulators, but also plant protection products. With regard to fertilization, the nitrogen dose is determined based on the size of biomass and the colour of the leaves (determined by chlorophyll content). Before starting the device, the operator enters the appropriate data - plant species, type of crop (fodder, bread), current development phase of plants, value of the pure ingredient in the fertilizer and expected yield [6]. Thanks to the device, the dosage of nitrogen fertilizer can be adapted to the needs of plants. Optical nitrogen sensors are offered not only by economic operators dealing with agricultural machines, but also producers of agrochemicals. A popular sensor on the Polish market (but also in Germany, Lithuania, Latvia and Estonia) is the YARA N-Sensor. Yara offers additionally a manual device for determining the nitrogen supply of plants (Yara N-Tester). There are also other system supporting tools mentioned in the literature.

An innovative idea regarding farmers' support in the field of plant protection was also presented in Poland by NEXBIO, which offers biotechnology solutions (DNA analysis). The DNA analyses carried out by NEXBIO allow very early detection of diseases of cultivated plants (even 1-5 months before their occurrence). This is because the technology used enables detecting even one cell of the micro-organism attacking the plant before the disease causes havoc in cultivation [3]. This makes it possible to make a decision about protection much earlier than in traditional support systems.

## Conclusion

The variety of treatments in agricultural holdings in the field of application of agrochemicals requires from the agricultural producer to have knowledge in many fields, including agronomy, agrotechnics, mechanization, economics and law. The potential threat to the natural environment is important in the study; hence the systems supporting the farmer in making a rational decision in this area, along with the IT tools used for this purpose, are very important. To a large extent, it shortens the time of collecting and processing large amounts of data. The uncertainty in a farmer's decision regarding the use of agrochemicals should be particularly minimized.

On the basis of statistical data and own research, it should be emphasized that the level of using farmer support systems in the field of agrochemicals is insufficient. The word 'insufficient' does not refer only to the number of farms and the number of systems used in them. 'Insufficient' means not meeting social and environmental needs, due to the relatively high consumption of mineral fertilizers and herbicides in Poland. The modern, innovative systems presented in the article have been up to now used only to a small extent. The main obstacles are investment costs and the lack of appropriate skills. Nevertheless, the presented systems can contribute to the optimization of fertilization treatments and chemical protection of plants in agricultural holdings in Poland. This is important from the perspective of shaping low-emission agriculture in Poland, which is influenced, inter alia, by the scope of application of agrochemicals.

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## Readiness of Companies in Relation to Industry 4.0 Implementation

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**Abstract.** First part of this paper theoretically describes the history of Industry 4.0 and its position in manufacturing companies. All four industrial revolutions are mentioned, also their impact on human society. Then the concept of Industry 4.0 is presented. Also, its characteristics and principles are mentioned here. In the next part readiness of companies in relation to Industry 4.0 implementation is analyzed. Several EU countries initiatives are described, their attitude to Industry 4.0 and successful preparation for the process, implementation and description is presented. The final part of the article summarizes all above mentioned

**Keywords:** Industry 4.0, Companies, Readiness, Implementation, Industrial Engineering, Initiatives, Internet of Things.

### 1 Four Industrial Revolutions

During its existence, humanity has undergone many important milestones in its development, including, for example, domestication of animals, which allowed people to move faster from collecting society to agriculture, bringing the appropriate food sources. As for other innovations or societal advances, human history can be considered as the origin of scripture, religion, political regimes, and ways of government, such as democracy or dictatorship, or discovery of a new world (American continent). All these steps represented only a grain of dust compared to what was yet to come [15].

The industry is an important sector of the world economy. It very quickly introduces scientific discoveries and technical inventions into production. Because Industry 4.0 is considered as fourth industry revolution, this introductory part details the historical course of each revolution. Here are listed here information on time slots and technologies that were key to each revolution, and what were the impacts on society at that time. Interestingly, the first three industrial revolutions first took place, or the world reached them, and have been named afterward. With the fourth revolution that is going on now, it's just the opposite. It can seem to have been enforced by force. This is because in the past technological changes took place sequentially. Always after a certain invention, it took many years to its influence began to manifest in the structure of factories and the labour market. Today it is different. Time is faster, thanks to

interconnectedness of the world. Changes around us happen instantly, they happen in parallel. According to [15] pace is 100 times faster than it was in the past

### **1.1 First Industrial Revolution**

The first industrial revolution took place between the 18th and 19th centuries, and its so-called cradle was England, then the most advanced country in the world. The result was a shift from manual production to manufactories to factory machinery. The quality of the machines has been subject to increasing demands, thus developing a new field of engineering. The symbol of this first industrial revolution is referred to as a steam engine, the invention of which is attributed to James Watt. Factory production also required new energy sources, especially coal. The form of organization of production has changed completely, resulting in the emergence of a new social stratum - the workers. There has been a revolution in transport, especially the great development of rail and shipping. This facilitated free trade and, together with the emergence of large-scale factories, it can be considered as a prerequisite for market economy. Enterprises have tried to maximize profits, and labor wages have been minimal and working hours have been very long. Thanks to the workers' dissatisfaction, the workers' trade unions and, later, the workers' political parties emerged. There have been major changes in society - a drop in mortality (due to the development of science), which has led to population growth and rise of cities. People's lifestyle has also changed, education grew, part of people's life became culture. We also need to mention the changes in agriculture - progress has been made to improve agricultural machinery and to increase production.

### **1.2 Second Industrial Revolution**

We also call the second industrial revolution a technical revolution. It is defined by the period from the 1880s to the 1930s. A characteristic feature is the use of electricity and an internal combustion engine. Industrial production in this period grew roughly threefold. There is a close interconnection of science and technology; the results of natural sciences are applied in industry. Due to the higher level of mechanization and division of labor (development of belt production), labor productivity has increased significantly. Significant progress has been made with the use of new energy sources - whether it was water-based energy, or, in particular, the energy of electric and internal combustion engines. The electric power was then used in lighting, machine drive, trams (significant development of public transport) and after the invention of the transformer also for the production of irons, washing machines, etc. Incineration engines were then used mainly to drive cars, motorcycles, motorized aircraft. There have been significant breakthroughs in the field of chemistry. As a result, new materials and materials have been developed - synthetic materials, organic compounds. A major change in industrial production was centralization and monopolization, which means pooling smaller businesses with an effort to control the market. Banking has become a major sector of the economy. Everything is accompanied by the growth of living standards, education,

and awareness of the population - the boom of newspapers and magazines, the invention of the phone, photography, and film.

### **1.3 Third Industrial Revolution**

The Third Industrial Revolution dates back to the 1960s and is called the scientific and technological revolution because the industry is very closely associated with science, with significant advances in natural and technical sciences and research. The first changes did not start in Europe, as in the previous stages, but in the United States. The revolution in the industry is primarily driven by the development of cybernetics, a field that deals with the rules of information management in machines and self-regulating systems. Together with discoveries in electronics cybernetics is at the beginning of computer technology. The first computers were completed in the US in the 1940s, but they were very large devices, usually occupying several rooms. In the 1960s, computers were made smaller and more powerful, and in 1975, even the first personal computer was put on sale. Just improving efficiency and speeding up the operation of computers meant their great use in industrial production - especially robotizing and automating production. In the energy sector, a breakthrough occurs due to the use of the core, as nuclear power plants are characterized by high performance. Transportation has also changed - steam locomotives are replaced by electric and motorized, aircraft are able to overcome distances between different continents in a few hours, dense networks of roads and highways have been built in developed countries, and the most common means of transport is becoming a car. In the field of medicine, there have been such successes as the implementation of transplants or the eradication of certain fatal diseases due to vaccination. Since the above-mentioned 60s, there has been essentially continuous progress, with all the technologies being continually being refined, and a new invention can be made every day that will push humanity back a little further.

### **1.4 Fourth Industrial Revolution**

Nowadays, and especially in the future, the Internet connects not only people but also machines and things. Virtual worlds are emerging to simulate the real world - we are talking about cyber-physical systems. Thanks to cyber systems, smart factories will be created where robots will take on monotonous and stereotypical activities that people have done so far. The fourth Industrial Revolution is spoken by 2011 and at least 30 years it will be discussed. This is where the term "Industry 4.0" is created [15]. Nowadays it is quite common to use internet where things, people and services are interconnected, and this is related to a generation of a huge amount of data (whether in human-human communication, machine-man-machine or machine-machine). The fourth industrial revolution, however, will not only concern industrial production but it will merge in other areas, such as the labor market, the social system, science and research, education system, legal framework, security, etc. It can be said that this is a new philosophy that brings society-wide change.

## **2 Characteristics of Industry 4.0 concept**

Thanks to the rapid development of new technologies, a new philosophy is created that brings a whole society a change affecting a whole range of areas - from industry, through technical standardization, security, education, law, science and research, the labor market, the social system, The Industry 4.0 concept is considered to be the key to ensuring greater efficiency and flexibility for manufacturing companies in the future [8].

It becomes an integral part of human life, becoming an accelerator of production processes and with concepts such as the digital factory, internet stuff, internet services, people's internet make up the future, where engineering production and related branches will go. There are relative terms for Industry 4.0, such as "Industrial Internet" or "Digital Factory". None of these terms does provide a complete view of the situation. The Industry 4.0 concept focuses on the digitization of all physical assets and integration into the digital ecosystem, including business partners within the value chain.

Part of the Euro-American Grouping of Countries to Maintain Global Leadership in the World strategy is rapid realization of the fourth industrial revolution. This revolution would have come without these strategies, but the Euro-American group has put in place many measures for the speed of its deployment. The essence of this revolution is to achieve fully automated production, introducing a change in the way process management and revolutionary changes relate to the human resource requirements of these processes to introduce the changes and then work on them and try to develop them. The main idea of Industry 4.0 is the computer interfacing of production machines, machined products and semi-products, and other systems and subsystems of an industrial enterprise (including ERP systems, business systems, etc.) [16]. The idea of Industry 4.0 strongly supports and develops the idea of FoF (Factory-of-the-Future) which has resulted in CIM (Computer Integrated Manufacturing) generalization through computer development and communication technologies and methods of artificial intelligence.

### **2.1 Industry 4.0 Relies on the Following "pillars":**

#### **1. Digitalization and integration of horizontal and vertical value chains**

Digitization and integration of vertical processes across the organization, from product development, purchasing, management, manufacturing, logistics, and services. Vertical processes will be linked with horizontal ones within corporate systems that will be a realistic time to respond to changing demand for products and services. Horizontal integration is connected with suppliers, customers, and other key partners. All data on operations and process planning can be performed in real time and use the support of expanded reality is perhaps the constant optimization of production processes.

#### **2. Digitization of products and services offered**

There will be so-called smart products that will be uniquely identifiable and localizable. The digitization of products is based on the expansion of existing products,

for example by adding smart sensors or communication devices that can be used with analytics data tools. Next, to create new digitized products that are targeted to a fully integrated solution. By integrating new methods to collect data and analyze data, companies are able to obtain information about the use of the product, this will not only know its history and current status but also alternative ways to improve the product to meet the growing needs of end products customers. This way, companies will put pressure on the consumer to be flexible and produce tailored products in a relatively short time. Software will help, where virtual prototyping will be possible – i.e. virtual designs not only of products but also of production means and processes.

### **3. Digitization of businesses and access to customers**

These technologies are being used already today. Very closely this pillar is related to the Internet of Things (hereinafter referred to as IoT) and the Internet of Services (IoS). In the customer segment, for example, use Customer Relationship Management (CRM) systems that integrate social networks and data analysis, especially in e-commerce. Social networks and available information on the Internet has increased customer demand for delivery speed and product quality. Customers on social networks, among other things, evaluate company products and provide reviews. Offered services through internet marketing are very much - clothing, cars, travel, financial services, employment, electronics, etc. If companies do not catch up of this trend and do not use the opportunity to communicate with customers in this way, there is a great risk from the point of view of the relationship with the public or marketing obsolescence [4].

In order for the concept to be realized, it is necessary to realize these 3 pillars described in the previous paragraph: digitalization and horizontal integration and vertical value chains, product digitization, and services offered, and digitization businesses and customer access, with the help of smart technologies such as 3D printing, sensors, large data analysis, autonomous robots, communication infrastructure, data storage and cloud computing, virtual and expanded reality, position detection, mobile devices, advanced interface human-machine, authenticity, fraud detection, multi-level customer interactions, and profiling customers.



**Fig. 1.** Industry framework 4.0 and contributing digital technologies [4].

In other words, the transition from standalone automated units to fully integrated automated and continuously optimized production environment. A new global will emerge networks based on linking production facilities to cyber-physical systems - CPS (Cyber-Physical Systems). CPS will be the basic building block of "intelligent factories", they will capable of autonomous exchange of information, evoking the necessary actions in response to the momentary conditions and independent controls. Sensors, machines, parts and IT systems will be mutually linked within the value chain beyond the boundaries of an individual company [6]. This is why the CPSs will be mutually interconnected using standard Internet-based communication protocols to respond and analyze the data in order to predict eventual errors or faults, to configure themselves and in real time adapt to changing conditions [6].

## 2.2 Industry 4.0 Principles:

When building Industry 4.0, the following principles are required:

**1. Interoperability** = ability of CPS, people and all components of "smart factory" to communicate together through IoT and IoS.

**2. Virtualization** = ability to connect physical systems with virtual and simulation on the machine. Each physical unit can have its virtual interpretation in the form of an autonomous one piece of code, or model software.

**3. Decentralization** = decision-making and management take place autonomously and in parallel in the individual subsystems.

**4. Ability to work in real time** = adherence to the real time requirement is key a condition for any communication, decision making and control in real systems world.

**5. Service Orientation** = Preferences of Computational Philosophy offers and uses standard services, it leads to SOA (Service Oriented Architectures). Individually autonomous units call for services by other units, and this function also provides IoT and IoS.

**6. Modularity and reconfigurability** = P4.0 systems should be maximally modular and capable of autonomous reconfiguration based on automatic recognition of the situation. Modularity is to connect a new device to the relevant communication network components will provide information about yourself. Relevant components will record this information „and knows they can turn to this machine (for example, if another machine loses communication ability) [11]. Reconfigurability is that the system itself reconfigures itself, if any other machine is being written off (repair, disconnection).

For clarification, it is appropriate first to state what the nature of Industry 4.0 is and what it is different about from the current state of industrial production. Three industries are affected by Interpretation 4.0 interconnected factors such as Digitization and integration of manufacturing and business relationships and String, Digitization of Production and Services and New Business Models [3]. These are now activities interconnected by a number of different communication systems. In the future, it would however, should be the most progressive communication technology of Internet Things (IoT), Internet Services (IoS) and Internet people (IoP). Thanks to these technologies, all entities could all throughout life cycle to communicate with each other regardless of the borders of companies or states. All entities along the production chain will have the necessary data in real time. This can happen to bring such an advantage, for example, that machine manufacturers will be able to design their machines anymore with components that are still being developed by their manufacturers, or that they can do business predict the failure of their devices in advance. [3]

### **3 Readiness of a Company for Industry 4.0 Revolution**

The advanced countries want to maintain their competitiveness and also expect to support new one's technology will increase the demand for specialists, i.e. professionals and hence better distribution paid positions. This should at least, as have expected, increase average wages and thus and living standards. The main reason is also their attempt to reduce the likelihood of others being mature countries will be faster in innovation [12].

A number of states are striving their industrial companies to innovate and invest in modern one's technology, so they offer, for example, accelerated depreciation or even tax holidays, all above all in order to keep their competitive ability against other countries. In Italy or France, is virtually immediate to write off two or a half times more than it was actually spent for Industry 4.0 technologies [13].



Fig. 2. Map of Industry 4.0 European initiatives.

### 3.1 Germany and its Initiative:

The fourth industrial revolution began in Germany. The initial vision of the Fourth Revolution was presented in 2011 at the Hanover Fair under the motto Computerization of industrial production. This document was created under the leadership prof. Henning Kagemann, prof. Wolfgang Wahlster and prof. Wolf-Dieter Lukas. At the initiative of the German Government, this version was elaborated in more detail on the national strategy and also presented in 2013 at the Hanover Fair under the title Evolution from embedded systems to cybernetic-physical systems. In this document automation technologies are focused on the distributed systems in which it is calculated with methods of auto-optimization, self-configuring, self-diagnosis, machine perception and intelligent support for the labourer. In general, this document is called Industrie 4.0. Germany has spent more than 400 million euros on this initiative and is taking part in it German engineering and electro technical companies such as Siemens, Bosch or Volkswagen. The main idea of the German initiative is that the computer interconnection of production machines, machined products and semi-products, all people involved in processes and all others systems and subsystems is very beneficial to create an intelligent distributed network of heterogeneous entities along a chain that creates value in an industrial enterprise [8]. Further, it is advisable to these subsystems have been autonomously and paralleled as needed and evolved in parallel. Each physical system has a virtual copy or image in the virtual environment. By connecting the Internet of things and services have created cybernetic-physical systems, where borders are not quite clear between the real world and the virtual world. These borders can be moved as needed, so it is possible part of the system to simulate and the part is



already working realistically, it is a feature that helps to get started new production, or to help change the architecture of the production system [11].

Industry 4.0 calculates the robust inclusion of robots into industrial production, both standard intelligent manipulators, and especially full-motion autonomous robots, such as drones or trucks without drivers. Very important is the role of man as an integral one a cooperative component that cooperates in a network of autonomous units through terminal (computer, tablet...) and has the authority to initiate and stop running processes [15].

The first example of Industrie 4.0 is the Bosch pump producing factory in Hamburg, Germany. Its manufacturing, including assembly groups, carry it across the production RFID mini transponders that collect embedded information in digital form. These are active members communicate with both crates on the production belt and with transponders machining or assembly lines, warehouse manipulators and a logistics center [8]. Along the whole chain from the manufacturer to the final customer, they store additional information. Another example is the Siemens EWA plant in Amberg, which produces fully automated line of the Simatic programmable control unit. Each of these units bears in its production chip manufacturing, design, and business and user information. These the information is encoded by the optical QR code as the product collected during production and the carrier and the user are working with them [14].

### **3.2 Austria and its Initiative**

In Austria there is an initiative "Industrie 4.0 Österreich - die Plattform für intelligente Produktion" and coordinates research projects and their funding in the Industry 4.0 area.

This initiative was founded as a platform by the following members:

- The Ministry of Transport, Innovation and Technology,
- Federal Chamber of Labor, Unions and Unions in Production.

### **3.3 France and its Initiative**

In 2013, France also started the first phase of its Industrie du Futur project, which is also focused on the new direction of the industry using modern technology. The program was launched for 34 industrial projects [1]. The next phase of the project continued in April 2014, when the Minister for Industry and Digitization presented the program to the French general public. The French initiative focuses on a total of twelve strategic areas - the last of which were added later, being:

- new sources of energy and materials; ecomobility; future transport; future health; smart devices; digital safety; healthy eating; high-capacity drones; e-learning for schools; renewable energy sources

The strategic plan for these projects is planned until 2030 and some of the projects require a change in legislation both at national, and at European level. The main project of the initiative, as it may be seen from its name, is the so-called "factory of the future", which intervenes in all industrial sectors. French economists say the slow growth of the

French economy is mainly due to insufficient investment in modern technology, which, of course, leads to a decline in the country's competitiveness [15].

### **3.4 Italy and its Initiative**

Italy has called its initiative to promote the development of the industrial revolution as *Fabbrica Intelligente*, the Italian government is aware of the need to support development and research and investment in new technologies to increase the competitiveness of the country and thus creates tax incentives for companies as well as subsidy programs.

### **3.5 Switzerland and its Initiative**

Switzerland owns the *Industrie 2025* platform, like Austria. The leading figure is the president and founder, Mr. Robert Rudolph. In this respect, Switzerland remains state-owned and is convinced that it is well prepared for the fourth industrial revolution, mainly due to the good interconnection of education and industry, good contacts with other states and a sufficient number of well-trained experts.

### **3.6 USA and its Initiative**

In USA in 2014 was founded The Industrial Internet Consortium, the five-nation multinational companies, is a platform linking the commercial, academic and government spheres to accelerate the development, adaptation and broad use of industrial Internet technologies. In addition, another broad, nonprofit platform, associating private companies, governmental, academic and research organizations, the Smart Manufacturing Leadership Coalition, was set up in 2012. It seeks to transform the industrial sector into a mutually interconnected, information-driven environment, enabling optimization of its own industrial processes and the whole value chain, increasing the productivity, innovation activity and quality of customer care. In the US, an Advanced Manufacturing Partnership 2.0 was also set up in the US, which in September 2014 defines 12 industry measures to boost innovation activity, support for education, and improve the business climate [8].

### **3.7 China and its Initiative**

The Chinese government has also launched its own program to increase the competitiveness of its industry by making it "Made-in-China 2025". The program is largely inspired by the German industry initiative 4.0 and focuses on ten major segments, such as new advanced IT technologies, the aerospace industry, the production of automated machine tools and robots, etc. [8].

### **3.8 South Korea and its Initiative**

South Korean government has developed its "Manufacturing Industry Innovation 3.0" in July 2014, aiming to expand the use of modern technologies in industrial production and to support the construction of intelligent factories. Total private and public sector investment exceeds € 750 million and aims to build 10,000 new intelligent outlets by 2020 [8].

### **3.9 Japan and its Initiative**

In Japan, in June 2015, a group of 30 Japanese companies launched an analogous initiative called the "Industrial Value Chain Initiative". It focuses primarily on the creation of technology standards for the interconnection of factories and their internationalization [8].

As we can see, different countries are "prepared" for Industry 4.0 in different ways. It seems, that historical background of each country has played a significant role here. Countries with „engineering“ backgrounds or traditions seem to me more ready, that „agricultural“ countries. Also, preparedness depends on a lot of other factors (social, technical, economical, geopolitical) of each country.

## **4 Readiness of a Company for Industry 4.0 Revolution**

The procedure of introduction of Industry 4.0 should correspond to the above mentioned Industry 4.0 Initiatives and its proposals for action across areas of the entire infrastructure state management. These suggestions lead to the conclusion that the focus should be on the areas in which they are at a weaker level than is appropriate to create an enabling and supportive environment introducing the idea of Industry 4.0. This is primarily about supporting science, research and innovation, that is, focusing more on funding innovation centres, the emergence of new centres with a focus on innovative technology, better interdependence with universities, support for emerging companies - start-ups, etc. Another benefit would be to inspire, for example, the German Fraunhofer Institute, which, is concerned with projects focusing on innovation and new technologies. An integral part of the aid Industry 4.0 is to spread his ideas to the wider society and also to include it into educational institute programs. It is precisely because of changes in education that there should be another Approaching the transition to Industry 4.0. These changes mean a change in methods teaching, content and extent of teaching. Consideration should be given to future developments and associated with them the fact that quite a few jobs will be lost and, on the contrary, a new one will emerge, and just that change education should also be addressed. At the same time, students are educated too narrowly focused on the given area, they should be educated in the future in a more general way and then narrow their focus later into practice. A key role is played by support for the digital economy and information and communication the technology through which the industry operates and is directly subject to these technologies.

#### **4.1 Prediction of Industry 4.0 Further Development and Implementation**

Czech Republic is not decisive in what can happen under Industry 4.0. implementation. Czech Republic can look around (what happens in others countries) and adapt appropriately to respond appropriately to Industry 4.0. To maintain competitiveness Czech Republic must be prepared as a co-operating partner able to absorb new technologies, integrate them and contribute adequately to innovation in global efforts. At the state level, it is necessary to prepare the infrastructure - high-speed broadband internet, legislation and human resources. In view of the above, it is difficult to expect further development of the implementation of Industry 4.0 elements. Every company will have a very individual process of implementing smart technologies, which are Industry 4.0. It depends on the digital maturity of the company and on the possibilities of ownership of companies.

### **5 Conclusions and Discussion**

Previous steps must be the simultaneous creation of information documents and strategic materials that will be used to act and through which the Industry 4.0 concept will be further expanded. These are, in my opinion, some of the most important starting steps that have to be taken so that the principles of the new industrial revolution can work in practice. Of course Document Industry Initiative 4.0 contains many other terms and conditions, technological, legislative, ethical and other, which are very important for further development industry and the future functioning of society.

The great changes brought by the fourth industrial revolution cannot be hidden. World market will force the Czech industry to make fundamental technological changes, whether it will or not, another the choice is not. The starting situation of the Czech Republic is not bad, but at the moment it is necessary to spend a big piece work and efforts to keep the situation at a relatively good level. In this moment has an irreplaceable role to stand. The state must be responsible for creating a national technical infrastructure (broadband high-speed internet) and setting a suitable social environment to support the course of the Fourth Revolution, in particular by reconfiguring the education and legal system, system security support, etc.

The Fourth Industrial Revolution is not only about industrial production. The company is undergoing a change that is caused by the interconnection of three worlds: the physical world, the virtual world the world and the social world. Industry 4.0 ideas make a completely different picture of the company's life. For this reason, the name "Industry 4.0" is misleading. At first glance it may be wrong understood. Therefore, it might be more accurate to talk about Society 4.0.

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## Current Opinions on ISO 9001 Quality Management System: Evidence from Poland

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**Abstract.** The aim of the paper is to identify and analyze the current opinions concerning the usefulness of the ISO 9001 quality management system among people (from small and medium enterprises) who are not directly involved into activities connected with implementing, maintaining and improving the systems. The survey was completed by 34 people including 29 representing manufacturing companies, and the remaining 5 represent service companies. The biggest group were executive directors (13 people), the second place was shared by owners and co-owners (8 people) and directors (8 people). The smallest group were the specialists (5 people). The research has proven that ISO 9001 quality management system is a management system that is widely used, and also gained recognition in business environment. This claim is confirmed by the fact that as many as 18 (from 34 included in the research) organizations were certified with ISO 9001. Additionally, all respondents (also those, who represented organizations without such certification) declared they knew what ISO 9001 quality management system is. It may also be assumed that the popularity of quality management system will not decrease in the nearest future despite the changes introduced to the standard in 2015.

**Keywords:** ISO 9001, Quality Management System, Small and Medium Enterprises.

### 1 Introduction

The ISO 9001:2015 international standard sets out the criteria for a quality management system (QMS). It has been one of the most commonly implemented management methods in the last two decades. The standard requires that an organization has verifiable routines and procedures in place for product design, manufacture, delivery, service and support. Under ISO 9001 an organization must monitor strictly the sequence of steps it takes for the completion of a job. For this purpose, it must follow process documentation. To guarantee compliance with the standard's requirements, third-party auditors evaluate an organization's procedures and carry out site visits. The end-result is supposed to be an improvement in the organization's performance [10].

A new revision on ISO 9001 standard was published in 2015. Organizations were granted a three-year transition period (until September 2018) to migrate from their

ISO 9001 QMS to the new edition of the standard. Facing this change, it is worth to consider the future of the international standard ISO 9001. Will the number of certificates grow, decrease in next few years or it will remain at the same level? The factor, which will definitely influence the forming of the phenomenon is the way of assessing the quality management system in business environment. Although the professional literature provides numerous results of research carried out among people directly engaged in the functioning of the quality management system in organizations (i.e. management representatives, quality managers, auditors, etc.), it is hard to find any that cover the rest of an organization's employees. The aim of the article is to identify and analyze the current opinions concerning the usefulness of the quality management system ISO 9001 among people who are not directly involved into activities connected with implementing, maintaining and improving the quality management systems. It concerns both, the ISO 9001 certified organizations as well as those which have not implemented or certified the QMS yet but may decide to do it in the future.

## **2 Theoretical Background**

The International Organization for Standardization (ISO) first published the ISO 9001 international standard in 1987, and since then it has undergone four amendments. The changes introduced in 1994, focused on a global approach to the life cycle of a product – from the customer's needs to the moment of the actual use of the product. The amendments of the 2000 simplified the standard's structure but most importantly included a number of crucial changes concerning the scope and content of the requirements. The revision also exchanged the term "quality system" with "quality management system". The next review, took place in 2008. It introduced minor changes meant to clarify some issues and also increase the conformity with ISO 14001 standard. In September 2015, a new version of the ISO 9001 was published. It shows many differences compared to the version of 2008. These changes imply various challenges to companies. They are mostly concerning the standard's structure, the dealing with external and internal parties, the process orientation, the support of the top management, the knowledge management and the dealing with risks and opportunities. From 2015, there is a 'High-Level-Structure', which is effective for all future ISO management system standards to make a standardized handling and a simplified integration of different management systems possible. Regarding the collaboration, the term 'interested parties' is introduced, which need to be defined individually by every organization. To do so, the external and internal parties' needs and expectations with influence on the company's QMS are closely examined. Furthermore, processes including input and output as well as the corresponding process key figures need to be clearly defined. Also, the top management is held increasingly responsible regarding the QMS' effectiveness. Within the knowledge management, there is an extended demand concerning the employees' competency development. This way, the knowledge of the employees is focalized more strongly, and the competency development will be thoroughly documented. One of the main

modifications is the risk-based approach, which requires companies to plan and realize measures to treat risks and opportunities [14].

In the past 26 years of ISO 9000 series standards existence, they have reached great popularity. The International Organization for Standardization (ISO) have carried out studies which prove that in 2017 as many as 1 058 504 organizations worldwide had a certified ISO 9001 quality management system. The biggest number of certificates stating the conformity with ISO 9001 was issued in: China, Italy, Germany, Japan, the UK, Spain, India, the USA, France and Brazil [8]. The fact of certain stabilization in the number of ISO 9001 certificates has also been confirmed [see Table.1].

**Table 1.** The number of ISO 9001 certificates [8].

Year	2011	2012	2013	2014	2015	2016	2017
Number of certificates	1 009 845	1 017 279	1 022 877	1 036 321	1 034 180	1 105 937	1 058 504

The quality management systems are proved by many surveys to be highly effective [3, 5, 17, 18]. However, it should be noted that there have appeared a number of publications pointing out some problems. [1, 7].

Definitely worth noticing is that the majority of the articles base on opinions of people directly responsible for quality management systems. They are mainly management representatives and auditors. What is more, in many case of numerous articles, the authors do not provide detailed characteristics of the respondents. They only inform that the answers come from a specific group of organizations e.g. small and middle-sized companies [3, 9]. It may be assumed that the responses in those cases also came from people directly dealing with quality management systems in the companies. The image of the systems of quality management created in this way may have a subjective character. Therefore it should be supplemented with information/opinions from other sources. One of the biggest groups which need to be included is organizations' representatives (especially the managers) who are not directly responsible for the functioning of the quality management system. In the nearest future, their opinions will significantly influence the maintenance of ISO 9001 systems in certified organizations and the implementation in organizations which have not done it before.

### 3 Research Methodology

For the needs of the following research a proper survey was prepared. It formulates 7 statements concerning ISO 9001 quality management system, i.e.:

1. Implementing ISO 9001 QMS organizes the activity of an organization.
2. Implementing ISO 9001 QMS increases competitiveness.
3. Implementing ISO 9001 QMS increases reliability of a company – they are willingly chosen as suppliers, cooperators etc.



4. Implementing ISO 9001 QMS is forced by e.g. customers, cooperators, local, regional and state authorities etc.
5. Implementing ISO 9001 QMS makes the products/services more likely to buy.
6. Implementing ISO 9001 QMS increases an organization's chances to receive financial help (donations, EU funding etc.)
7. Implementing ISO 9001 QMS in an organization leads to tangible quality increase of products and services.

The task of the respondents was to grade all of them using a 7-point scale from 1 to 7 where 1 means definitely not while 7 means definitely yes.

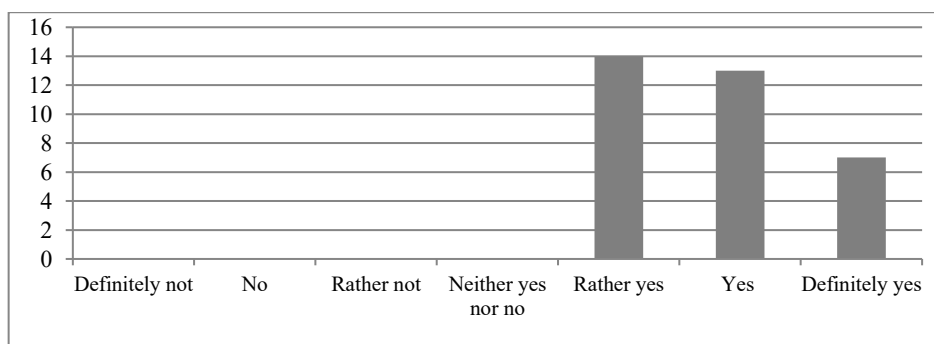
The second part of the survey included questions characterizing the respondents. Auditorium questionnaire was chosen as the research method. This technique is a form of measurement suitable for application during such events as conferences, symposia, lectures, trade shows. The research involves distributing questionnaires to its participants, and after answering the questions – an interviewer collects the completed questionnaires. The possibility of measurement control is an advantage of the auditorium questionnaire, which enables to achieve a huge percentage of answers and to preserve anonymity at the same time [6].

The annual symposium of SIMP association was held on March 2018. The organization incorporates the leading small and medium enterprises (mostly manufacturing industries) from the region of Jelenia Góra, Poland. The aim of the association is to initiate, maintain and support cooperation among its members. The symposium was visited by 43 members who were included in the research. The survey was completed by 34 people including 29 representing manufacturing companies, and the 5 represent service companies. The biggest group were the executive directors (13 people), the second place was shared by owners and co-owners (8 people) and directors (8 people). The smallest group were the specialists (5 people). More than a half of the respondents represented ISO 9001 certified organizations (18 organizations). It is interesting that all respondents claimed to be familiar with ISO 9001. Grading the statement „I know what ISO 9001 quality management is”, 14 people answered “rather yes”, 13 marked the “yes” answer and the remaining 7 chose answer “definitely yes”.

## 4 Research Results

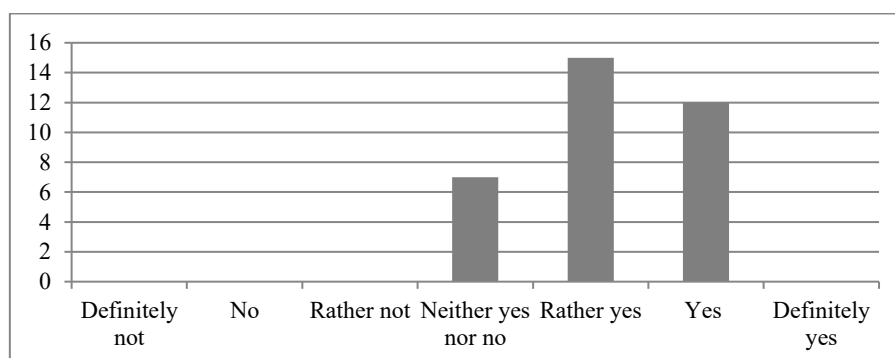
In the research process the respondents were asked to grade 7 statements concerning ISO 9001 quality management system. The statements were formulated on the basis of literature review [2, 3, 4, 5, 7, 12, 14, 15, 17, 18].

The first of them was formulated as follows: „Implementing ISO 9001 quality management system organizes the activity of an organization”. The distribution of the answers is shown in Fig.1.



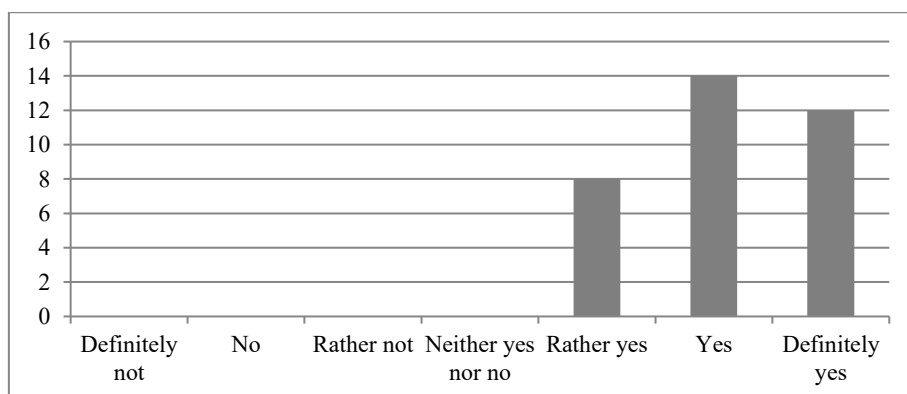
**Fig. 1.** The distribution of the answers concerning statement “implementing ISO 9001 quality management system organizes the activity of an organization”.

The second statement was expressed in this way: „Implementing ISO 9001 quality management system increases competitiveness”. The distribution of the answers is shown in Fig.2.



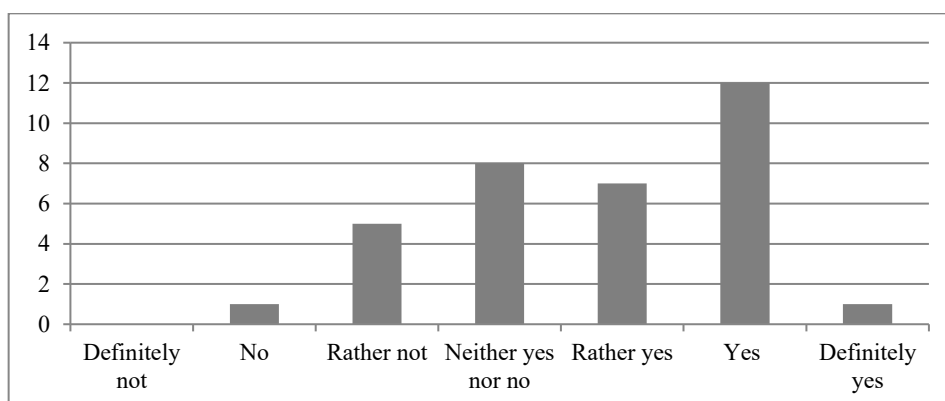
**Fig. 2.** The distribution of the answers concerning statement “Implementing ISO 9001 quality management system increases competitiveness”.

The next issue concerned the reliability of an organization. The distribution of answers concerning statement „Implementing ISO 9001 quality management system increases reliability of a company – they are willingly chosen as suppliers, cooperators etc.” is presented in Fig.3.



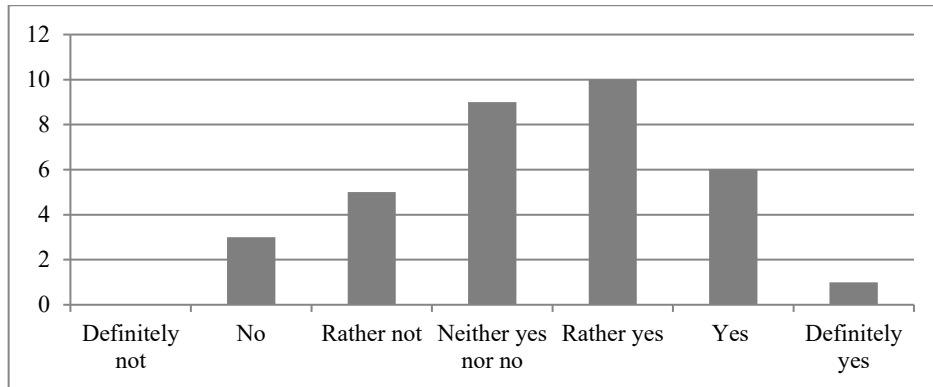
**Fig. 3.** The distribution of the answers concerning statement “Implementing ISO 9001 quality management system increases reliability of a company – they are willingly chosen as suppliers, cooperators etc.”

The fourth issue was defined as „Implementing ISO 9001 quality management system is forced by e.g. customers, cooperators, local, regional and state authorities etc”. The distribution of the received answers is shown in Fig.4.



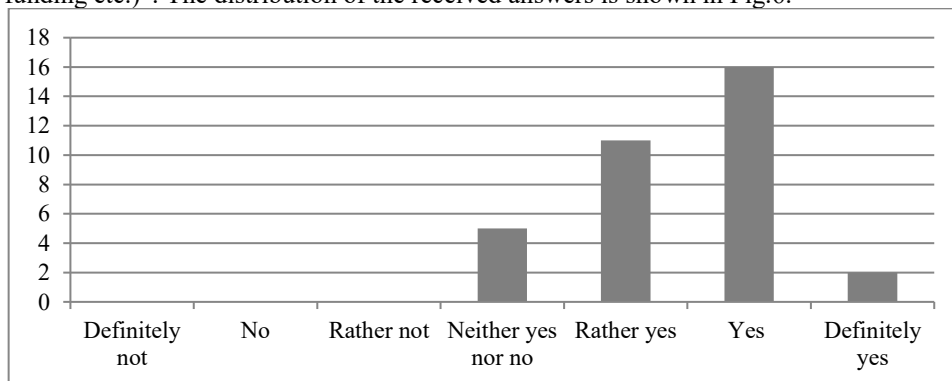
**Fig. 4.** The distribution of the answers concerning statement „Implementing ISO 9001 quality management system is forced by e.g. customers, cooperators, local, regional and state authorities etc.”

The next statement is defined in the following way: „Implementing ISO 9001 quality management system makes the products/services more likely to buy”. The distribution of the received answers is shown in Fig.5.



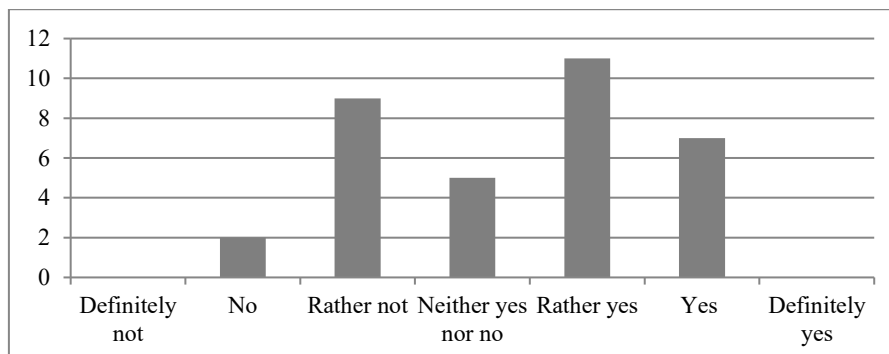
**Fig. 5.** The distribution of the answers concerning statement „Implementing ISO 9001 quality management system makes the products/services more likely to buy.

The sixth issue also concerned the incentives for implementing a quality management system. It was defined as follows: „Implementing ISO 9001 quality management system increases an organization’s chances to receive financial help (donations, EU funding etc.)”. The distribution of the received answers is shown in Fig.6.



**Fig. 6.** The distribution of the answers concerning statement „Implementing ISO 9001 quality management system increases an organization’s chances to receive financial help.

The last statement included in the survey was expressed in the following way: „Implementing ISO 9001 quality management system in an organization leads to tangible quality increase of products and services”. The distribution of the received answers is shown in Fig.7.



**Fig. 7.** The distribution of the answers concerning statement „Implementing ISO 9001 quality management system in an organization leads to tangible quality increase of products and services.

## 5 Discussion

The carried-out research confirms opinions that ISO 9001 quality management system is a management tool which is currently recognizable and used in business environment [4, 11]. This claim is confirmed by the fact that as many as 18 (from 34 included in the research) organizations were certified with ISO 9001. Additionally, all respondents (also those, who represented organizations without such certification) declared they knew what ISO 9001 quality management system is. Almost 60% claimed that the level of their knowledge of the topic is good or very good. Also, the results published by ISO show that the number of valid certificates remains at a stable level exceeding 1 million. Although they noted a drop of this rate in 2017 in comparison to the previous year, when analyzing the number of valid certificates in a 7 years span it is clear that such changes are natural characteristics of the issue.

The second conclusion which may be formulated on the basis of the carried-out research concerns the evaluation of the usefulness of ISO 9001 quality management system. All benefits connected with QMS which were included in the survey were confirmed by business representatives. This conclusion is in the line with the results of the research carried out by Rusjan and Alič, which prove, that ISO 9001 QMS has a positive influence on the relations with customers, internal processes of the organization, development of the organization and financial results [13]. Average evaluation of the benefits connected with ISO 9001 quality management system (the respondents graded every benefit in 1-7 scale).

**Table 2.** Evaluation of the benefits resulting from ISO 9001 quality management system.

Benefits resulting from ISO 9001 QMS	Average grade
Organizing the organization's activities	6.21
Reinforcing credibility	6.12
Improving chances for receiving financial help	5.44
Improving competitiveness	5.15
Increase in the sale of products or services	4.41
Real increase in the quality of products/services	4.35

The image of ISO 9001 received from the results of the research does not confirm appearing in professional literature opinions that the attractiveness of the quality management system has recently diminished [16] or that in the small and medium enterprises it has a limited usefulness [11].

The respondents also claimed that certain entities (i.e. clients, cooperators, authorities) put pressure on organizations in order to persuade them to implement and maintain ISO 9001 quality management system. The average evaluation of the statement "Implementing ISO 9001 quality management system is forced by e.g. customers, cooperators, local, regional and state authorities etc" was set at 4.79.

Summarizing, it may be claimed that ISO 9001 quality management system is a method of management which is commonly used in business and is appreciated by the business environment. Therefore, it is possible to conclude that in spite of changes introduced in ISO 9001 standard in 2015 the popularity of this solution in the next few years will not significantly change.

## 6 Conclusions

The purpose of the study was to find out and analyze the opinions concerning usefulness of ISO 9001 quality management system of the business representatives who are not directly involved in activities connected with implementing, maintaining or improving the quality management systems. The research has proven that ISO 9001 QMS is a management method that is widely used, and also gained recognition in business environment. It may also be assumed that the popularity of quality management system will not decrease in the nearest future despite the changes introduced to the standard in 2015.

Like other this type studies, the research has some limitations. First of all the research covered organizations from one country only while ISO 9001 quality management system is globally used. Therefore, the group of respondents should be extended to include representatives of other countries. Secondly, the research bases on opinions of people representing organizations with ISO 9001 certification and those with no certificate of the type. It seems reasonable to divide the two groups to verify whether they significantly differ in their opinions. Thirdly, while providing the answers, the respondents were driven by their personal impressions (e.g. in the range of their ISO 9001 knowledge). Therefore, it is necessary to perform additional studies

in order to make the image more objective. However, it must be remembered that those subjective opinions are very important too, as they influence decisions concerning implementing or maintenance of quality management system. The last limitation is including only SME in the research, whereas the big organizations, especially international concerns mainly set trends in the area of quality management and certification.

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## Methods of Estimating Particulates Emission in Agriculture Exemplified by Animal Husbandry

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**Abstract.** The indicators of emission from fuel combustion processes may be referred to the unit of raw material or energy obtained from combustion. They may concern a particular technology and make it possible to estimate the amount of pollution emitted to air on the basis of raw material balancing. The indicators may concern a particular technology but their basic function is to create tools that make it possible to compare the volume of pollutant emission to air per a unit of product obtained with the use of different production technologies. The article presents an analysis of the volume of pollution with PM<sub>2.5</sub> in animal husbandry conducted in the period 2014-2016. Data concerning particular sources of emission come from the information provided by the Central Statistical Office in Warsaw. The estimation of PM<sub>2.5</sub> and PM<sub>10</sub> emission was conducted on the basis of the structure of sources of emission resulting from agriculture in accordance with the Tier 2 method. The analysis shows that the highest PM<sub>2.5</sub> pollution results from pig and poultry farming and its volume accounted for 0.10 Gg in 2016.

**Keywords:** Particulates, PM<sub>2.5</sub> Emission, PM<sub>10</sub> Emission, Animal Production, Agriculture, Poland.

### 1 Introduction

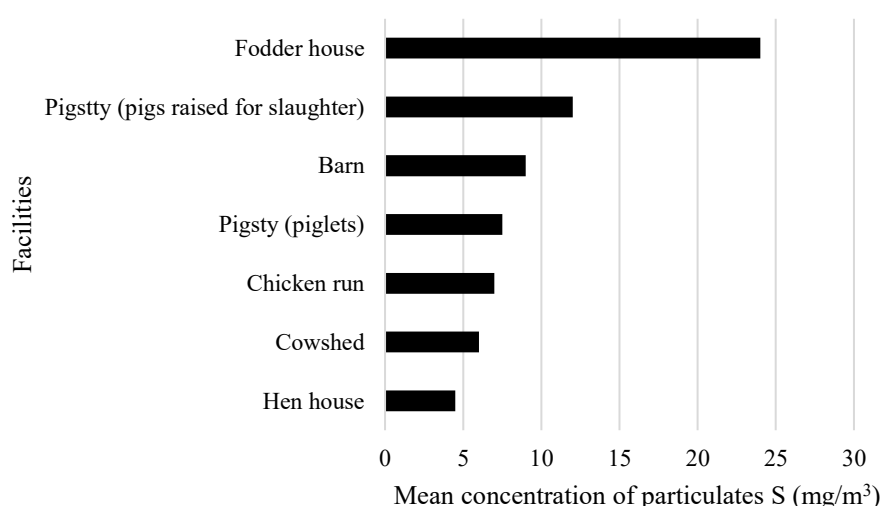
Pollution with particulates is one of the most disadvantageous forms of air pollution. Particulates should be understood as “a group of solid particles that were thrown into the atmosphere and remain in it for a certain period” [11]. At present, there is a classification of particulates based on the size of particles and their impact on human health. The term total suspended particulates (TSP) means the total content of particulates in air. Particulate matter (PM<sub>10</sub>) means suspended particulates with a diameter below 10 µm. Fine particulate matter PM<sub>2.5</sub> means a group of suspended particulates with a colloidal dispersion of particles with a diameter below 2.5 µm [3].

The source of particulates is common and concerns industry as well as agriculture. For the control of the quality of air, the following classification of suspended particulate matter is used: particles with a diameter of 2,5 m (PM 2,5) and 10 m (PM 10) [20]. Fine particles hover in the air. They reach the atmosphere as a result of natural as well as anthropogenic processes [15]. The natural sources of particulates emission include deposition materials, volcano eruptions and forest fires. The artificial sources of air

pollutants include actually all production processes and combustion (especially fossil fuel combustion) [7]. Five main categories of particulates emission sources may be distinguished: power plants, industrial energy generation, industrial technologies, other stationary sources such as boiler-plants and household fireplaces, and mobile sources [11].

In practice, the measurement is made with the use of different specialist devices depending on the size of particles. Systematic measurement of the level of air pollution with particulates in Poland is conducted in accordance with Directive 2008/50/EC and Regulation of the Minister of the Environment [5, 17]. The measurement of the suspended particulate matter (PM10 and PM2.5) is conducted by the Chief Inspectorate of Environmental Protection [8] with the use of the gravimetric method, which is recognised and used as the most precise one, as well as the automatic method [8]).

Particulates practically originate from any activity, including agricultural operations, soil cultivation, mineral fertilisation, hay collection as well as animal husbandry (fodder provision), drying, reloading, blending dry substances, grist milling, grinding, and bedding animal sheds and fodder houses [4]. Pollution with particulates in farm facilities for livestock is presented in Figure 1.



**Fig. 1.** Pollution with particulates in farm facilities for livestock [12].

Particulates found in agriculture are organic fine particles (of animal, plant and microorganism origin) or non-organic particles (chemicals or minerals) [18]. Agricultural particulates may contain bacteria (e.g. mites), the Acaridae (arachnids), mould, pollen, and particles of hair, feathers, skin or fur [4]. Although the structure of particulates and their fractions has an enormous impact on their movement, the spatial and climate conditions play an important role. Pollution with particulates differs depending on the place. The highest concentration of particulates is recorded in poorly ventilated closed areas (e.g. fodder houses) and places where intensive operations are

performed, e.g. reloading or harvesting (mowing). The main climatic factors affecting the movement of fine particles in air include a strong wind and low humidity.

## 2 Methodology

The measurement of the intensity of pollution with particulates is conducted based on the factor determining air pollution. The factor of emission (EF<sub>pollutant</sub>) of PM<sub>10</sub> and PM<sub>2.5</sub> may be determined in different ways:

- Direct measurement conducted with the use of initial separators. Sampling consists in the division of an air stream from the source of pollution into different components based on aerodynamic features of the particulate matter. The measurement provides immediate results and makes comparison possible.
- Measurement of the share of PM<sub>10</sub> and PM<sub>2.5</sub> in the total particulates emission.
- Analysis of the calculation of PM<sub>10</sub> and PM<sub>2.5</sub> fractions in relation to TSP.

The indicators of pollutant emission are calculated in order to determine the size of emission to the atmosphere as a result of technological processes. Pollutant emission indicators are determined for most of the typical production processes in different industries. They specify typical amounts of pollutants with the greatest impact on the environment. They are emitted as a result of a certain process and expressed in units of a given pollutant mass per a unit of time, product or useful effect, and a unit of combusted fuel or energy used [14]. Emission indicators in relation to the unit of product are compared with emission standards: BAT – Best Available Technique [2].

The description of emission indicators can be found in EMEP/EEA Air Pollutant Emission Inventory Guidebook 2016 published by the European Environmental Agency. The Guidebook is aimed at serving the unification of emission inventory systems worldwide. Emission indicators are broadly developed individually for each source of emission subdivided into the following main categories:

- Combustion processes in the production of electricity and heat,
- Combustion processes in industry,
- Fuel combustion processes in heating plants and boiler-houses (other non-stationary combustion sources),
- Industrial processes (industrial technologies), including other processes except fuel combustion,
- Road transport and other transport (mobile sources), including rail transport, inland navigation, agricultural transport as well as air and sea transport,
- Waste management and treatment,
- Agriculture.

The methodology adopted in the Guidebook envisages estimation of emission at three tiers. The first basic one (Tier 1) encourages applying emission factors that represent ‘typical’ or ‘averaged’ process conditions, which are technology independent. At the second, intermediate tier (Tier 2), emission factors refer to particular technologies. On

the other hand, the third tier (Tier 3) requires detailed data concerning facilities being the source of emission.

Below, there is a presentation of pollutants in agriculture for which emission factors are determined and the place in the EMEP/EEA Guidebook [16], where the information concerning the value can be found. It was decided to limit the list to presumed factors (Tier 1) because in most cases, the factors refer to the same substances regardless of technology used. The list of emission factors of the EMEP/EEA Guidebook [16] for agriculture is presented in Table 1.

**Table 1.** List of factors for agriculture [16]

Process	Pollutants for which emission factors are determined	Source of information according to EMEP/EEA
Manure management	NH <sub>3</sub> , NO, NMLZO, TSP, PM <sub>10</sub> , PM <sub>2.5</sub>	Sub-chapter 3.B Tables from 3-1 to 3-4
Crop production	NMLZO, NH <sub>3</sub> , PM <sub>10</sub> , PM <sub>2.5</sub> , NO	Sub-chapter 3.D
Burning of stubble	NO <sub>x</sub> , CO, NMLZO, NH <sub>3</sub> , TSP, PM <sub>10</sub> , PM <sub>2.5</sub> , soot, Cd, Hg, As, Cr, Cu, Ni, Se, Zn, PCDD/F, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, indeno (1,2,3-cd) pyrene	Sub-chapter 3.F

The latest indicators of the emission of CO<sub>2</sub>, SO<sub>2</sub>, NO<sub>x</sub>, CO and TSP in the course of electricity production were published in February 2017. In the document, there are calculated pollutant factors based on the data provided in the 2015 report by the National Centre for Emissions Management (KOBIZE). In the course of estimating the value of emission factors, fuels (including renewable ones) used in internal combustion facilities within the SNAP-0101 category (power plants and heat generating plants) and SNAP-0301 (energy industry), were taken into account. It was determined that the value of TSP emission indicator for electricity produced in combustion facilities accounts for 0.063 kg·MWh<sup>-1</sup>, and the value for end users of electricity is 0.062 kg·MWh<sup>-1</sup> [10].

The National Centre for Emissions Management is an institution reporting the level of pollution emitted to the atmosphere. The level of particulate emission is estimated each year and published in the report entitled “Krajowy Bilans Emisji SO<sub>2</sub>, NO<sub>x</sub>, CO, NH<sub>3</sub>, NMLZO, Pyłów, Metali Ciężkich i TZO w układzie klasyfikacji SNAP i NFR”. The air pollution level is calculated based on the structure of emission sources laid down in the “EEA/EMEP Emission Inventory Guidebook” [6] in accordance with the SNAP classification. The share of PM<sub>2.5</sub> in successive years accounted for 7.25, 6.22, 1.51 and 9.68% respectively. The PM<sub>2.5</sub> emission from selected sources in the period 2012-2015 is presented in Table 2.

**Table 2.** Emission of PM2.5 in the period 2012-2015 [9, 10].

Emission source	PM2.5 emission [Mg]			
	2012	2013	2014	2015
Total	144,771	144,510	125,520	124,562.5
Combustion in electricity and heat production sector	14,901	14,932	13,404	13,411
Non-industrial combustion processes	71,679	73,498	67,102	66,030
Agriculture	512	339	486	549
	0.35%	0.02%	0.39%	0.44%

The level of the PM2.5 emission in the period 2012-2015 from agriculture was presented in the table above. According to the stated hypothesis the calculation of Tier 2 method that uses the factors for particular categories of animals should compare to the National Centre for Emissions Management [10] PM2.5 emission values. The idea of confirming the hypothesis is to compare the obtained results from both sources.

### 3 Research Findings

The highest PM2.5 emission accounts for 0.129 Gg and originates from burning agricultural residue, including grass burning, and the lowest emission accounts for 0.002 Gg and originates from horse breeding. The level of PM2.5 emission from animal farming in 2014 according to KOBIZE is presented in Table 3.

**Table 3.** PM2.5 emission to air from agriculture and fuel combustion in agriculture, forestry and fishing in 2014 [13].

Husbandry/farming		PM 2.5	
Industry	Type	Gg	%
Agriculture	Dairy cattle	0.022	0.005
	Non-dairy cattle	0.031	0.006
	Swine	0.074	0.015
	Horses	0.002	0.000
	Laying hens	0.035	0.007
	Broilers	0.073	0.015
	Other poultry	0.094	0.019
	Field burning of agricultural residues (and grass burning)	0.129	0.027
Fuels	Stationary combustion	8.541	1.757
	Vehicles and machinery (off road)	8.283	1.704
	Fishing (off road)	0.408	0.084

In case of animal production, emission of particulates takes place mainly during cleaning and ventilation of farming facilities, and the removal of manure and other post-production residues. The selection of a proper method of estimating the emission of particulates from animal production, like in case of agricultural production and agricultural soil, should be done in accordance with recommendations laid down in the EMEP/EEA Guidebook [6].

In order to determine particulate emission with the use of the Tier 1 method, it is necessary to determine the right category of farm animals, including the category of cattle and swine and select a proper factor of the level of pollution. Emission of pollutants ( $E_{\text{pollutant\_animal}}$ ) for the selected category of farm animals takes into account the average annual animal population ( $AAP_{\text{animal}}$ ) and the rightly selected EF factor ( $EF_{\text{pollutant\_animal}}$ ). It is calculated following equation (1).

$$E_{\text{pollutant\_animal}} = AAP_{\text{animal}} \times EF_{\text{pollutant\_animal}} \quad (1)$$

where:

$E_{\text{pollutant\_animal}}$  – pollutant emission for the category of farm animals, kg/year,

$AAP_{\text{animal}}$  – average annual animal population, head/year,

$EF_{\text{pollutant\_animal}}$  – pollutant factor EF.

The presumed values of the EF factor for particular categories of animals (NFR classification) are presented in Table 4.

**Table 4.** Presumed EF values in animal classification [1, 21].

NFR	Animal classification	EF for TSP (kg AAP <sup>-1</sup> year <sup>-1</sup> )	EF for PM10 (kg AAP <sup>-1</sup> year <sup>-1</sup> )	EF for PM2.5 (kg AAP <sup>-1</sup> year <sup>-1</sup> )
3B1a	Dairy cattle	138	0.63	0.41
3B1 b	Cattle (young cattle, beef cattle, and sucking cows)	0.59	0.27	0.18
3B1 b	Cattle (calves)	0.34	0.16	0.10
3B2	Sheep	0.14	0.06	0.02
3B3	Swine (fattening pigs)	1.05	0.14	0.006
3B3	Swine	0.27	0.05	0.002
3B3	Swine (sows)	0.62	0.17	0.01
3B4a	Buffalo	1.45	0.67	0.44
3B4d	Goats	0.14	0.06	0.02
3B4e	Horses	0.48	0.22	0.14
3B4f	Mules and asses	0.34	0.16	0.10
3B4gi	Laying hens	0.19	0.04	0.003
3B4gii	Broilers	0.04	0.02	0.002
3B4giii	Turkeys	0.11	0.11	0.02
3B4giv	Poultry (ducks)	0.14	0.14	0.02
3B4giv	Poultry (geese)	0.24	0.24	0.03
3B4h	Other animals (fur animals)	0.018	0.008	0.004

The values ( $AAP_{animal}$ ) should be averaged and refer to an annual scale. Livestock can be determined based on the statistical data of the Central Statistical Office in Warsaw. The emission of particulates in horse breeding and cattle farming is presented in Table 5.

**Table 5.** Measured PM2.5 emission [1].

NFR	Livestock	State of matter	Emission	
			mg	mg/h
3B1a	Cattle	liquid	172.5	28.5
		solid	89.3	28.0
3B1a	Cattle (including young cattle and dairy cattle)	liquid	113.0	13.7
		solid	85.5	16.0
3B1a	Cattle (calves)	liquid	127.5	19.5
		solid	132.0	27.3
3B4e	Horses	solid	448.5	47.5
		solid <sup>(a)</sup>	55.0	-

<sup>(a)</sup> Takai et al. 1998, Seedorf and Hartung 2001 [21, 19]

The EF measurement factors in the Tier 2 method used to determine the level of particulates in animal husbandry venues are developed individually in relation to the level of particulate emission in the given area. The research into the level of particulate emission was conducted in the period 2014-2016 and it confirmed the differences in particulate emission depending on the place of measurement. Data taken into account during the analysis are presented in Table 6.

**Table 6.** Data taken into account during the analysis.

NFR	Livestock	Livestock population [mln]			EF PM2.5 kg/year	AAP <sub>animal</sub> , head/year		
		2014	2015	2016		2014	2015	2016
3B1a	Dairy cattle	2,25	2,13	2,13	0.41	2,247,800	2,134,091	2,129,855
3B1b	Calves	2,89	3,15	3,36	0.1	2,894,868	3,148,445	3,355,103
3B2	Sheep	0,02	0,22	0,24	0.02	201,270	221,187	244,171
3B4d	Goats	0,08	0,08	0,04	0.02	81,727	81,727	44,204
3B4e	Horses	0,21	0,21	0,19	0.14	207,065	207,065	185,494
3B3	Swine	11,72	11,64	11,10,75	0.002	5,781,699	5,740,274	5,477,671
3B4gi	Hens	41,77	45,63	47,07	0.003	6,866,134	7,500,726	7,737,938
3B4gii	Chickens	88,09	100,49	121,96	0.002	14,480,822	16,519,454	20,048,292
3B4giv	Other poultry	16,91	17,30	18,74	0.02	2,779,666	2,844,292	3,080,841

The results of the analyses of PM 2.5 levels in animal production conducted in the period 2014-2016 in comparison with the available KOBIZE analyses are presented in Table 7.

**Table 7.** Results of the analyses of PM2.5 levels in animal production conducted in the period 2014-2016.

NFR	Livestock	E <sub>pollutant_animal</sub> , Gg			E <sub>pollutant_animal</sub> <sup>(a)</sup> , Gg	
		2014	2015	2016	2014	2015
3B1a	Dairy cattle	0.01	0.02	0.02	0.02	0.02
3B1b	Calves	0.01	0.03	0.03	0.03	0.03
3B2	Sheep	0.00	0.00	0.00		
3B4d	Goats	0.00	0.00	0.00		
3B4e	Horses	0.00	0.00	0.00	0.00	0.00
3B3	Swine	0.02	0.10	0.10	0.10	0.10
3B4gi	Hens	0.02	0.03	0.04	0.03	0.04
3B4gii	Chickens	0.04	0.07	0.08	0.07	0.08
3B4giv	Other poultry	0.01	0.09	0.10	0.09	0.10

<sup>(a)</sup>KOBIZE 2015, KOBIZE 2017 [9, 10]

## 4 Conclusions

The biggest amounts of particulates reach air from industry: energy sector, chemical industry, mining, metallurgy and construction. Removing particulates from gas is a necessity in many processes in heavy industry (e.g. ferrous and nonferrous metal making, metalworking, woodworking, plastic working), municipalities (fossil fuel combustion, and ventilation and air conditioning systems) [14] and agriculture (e.g. animal production and straw burning).

The main contribution in article is the comparison of own calculated PM2.5 levels that uses the factors for particular categories of animals to National Centre for Emissions Management PM2.5 emission analysis. The results of the analyses of the PM2.5 level in animal production conducted in the period 2014-2016 in comparison with the available analyses of the National Centre for Emissions Management [10] do not show significant differences. This statement fully confirms stated hypothesis about comparison of obtained results from both sources. The results of the analyses of PM2.5 levels in animal production were additionally calculated for the year 2016. According to estimates, the level of PM2.5 pollution in the year 2016 compared to previous years slightly increased. The increase was specially notice for hens, chickens and other poultry, by value 0.1 Gg per year.

It was not possible to compare the level of PM2.5 for sheep and goats during the analyses. The highest pollution level was typical of swine and poultry farming for which the pollution values accounted for 0.10 Gg according to many authors as well as the 2016 KOBIZE data [10].

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## Strategic Management of Agricultural Research and Innovation through EU Law

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**Abstract.** This paper critically assesses the most important European Union's instruments directed towards sustainable development as part of the process of agricultural research and innovation. The most significant European directives and regulations issued within the past ten years are evaluated in terms of efficiency directed towards economical effectiveness and its balance with environmental concerns. Strategic management of agricultural innovation is examined with regard to important resources in the European Union member states as well as elsewhere, especially in areas which are directly affected either by the agricultural practices of the European Union member states or by economic activities of subjects registered thereof. Together with focus on the health of plants and animals, other natural resources are taken into consideration, such as soil, water quality and social factors such as rural development. In addition to the European legislative instruments, other policy papers are taken into account in our assessment of strategic management of agricultural research and innovation through EU law, especially the policy document entitled European Commission: Strategic Approach to EU Agricultural Research Innovation.

**Keywords:** Agricultural Innovation, Agricultural Research, Economic Impact, EU Law, Strategic Management.

### 1 Introduction

Farmers and foresters, as well as bio-based and food industries are subject to innovation in techniques and are dependent on production, medical as well as agricultural research outcomes. Not differently from other industries, these fields have to succeed in tough competition which is regulated by market forces, supply and demand in the said industries, consumer preferences, development of complimentary goods, but also through ethical and health considerations and expectations placed on food. Therefore, agricultural research and innovation is thoroughly regulated through legislature on both domestic and international level. Legal regulation of agricultural research and innovations is especially imminent within the European Union, where the common market and other interconnected strategies require authorities and legislators to enable enterprises work across borders, while at the same time maintaining regional specifics. In short, legal regulation helps agricultural industries meet future challenges.

The principal purpose of this paper is to critically evaluate the current legal provisions of the European law that are pertinent to strategic management of agricultural research. Our overarching aim is to provide an overview of the present legislative *status quo*, having in mind the recent legal development that has immediately preceded it and the present-day legal background surrounding the particular legal provisions specifically devoted to agricultural research and innovation and the strategic management thereof.

## **2 Methods – Doctrinal Legal Approach to Analysis**

This paper undertakes the doctrinal legal research methodology. Following this “distinctly legal approach to research” [12] enables us to evaluate the wording and layout of the most important legal instruments in light of their development and current place in the European legal system. Our research is “situated” [16] in the black-letter methodology of the continental legal tradition.

While it is taken into consideration that the law of the European Union combines the civil law traditions with the focus on case-law, we view our assessment of the legislative instruments and statutes within the European Union as sufficient. This is supported by recent research on the methodological choices underpinning doctrinal legal approaches, which have led to the finding that “legal reasoning” is the “same intellectual activity” whether conducted on a statute in the continental legal tradition or on a court case as part of the traditional approach adopted in the common legal system [13].

Finally, our choice of doctrinal legal methodology adheres to the recently emerged and proliferating field of literature assessing agricultural development in the East of the European Union. For example, researcher in Central Europe have conducted studies evaluating the methodologies used in agricultural studies in Poland and Bulgaria and have come to the conclusion that the assessment of the “soundness” of legislation is crucial to the effective management of lands and other agricultural real properties [14].

## **3 Research - Agricultural Research and Innovation**

### **3.1 Knowledge and the Common Agricultural Policy**

The Common Agricultural Policy involves, among others, a long-term strategy. In July 2016, the European Commission published a paper specifying the details of strategic approach of the European Union towards agricultural research and innovation. There were more than 600 experts who contributed to the paper through workshops, consultations and other events [11].

The programme paper lists five priority areas for sustainable development in agriculture and food production [6]. Firstly, it is resources management, especially regarding soil, water and biodiversity. Secondly, healthier plants and animals are taken into consideration. Thirdly, the strategic document concerns integrated ecological approaches from farm to landscape level. Fourthly, new openings for rural growth are

taken into account. Finally, the strategic plan regulates enhancing the human and social capital in rural areas. All of these concerns priority areas are interconnected with the issue of societal challenge and specifically regulated through the European Union's legislative document entitled Regulation (EU) No 1291/2013 of the European Parliament and of the Council of 11 December 2013 establishing Horizon 2020 - the Framework Programme for Research and Innovation (2014-2020) [9].

Other European regulations and directives are linked to the possibilities of agricultural innovations while maintaining sustainable development. In particular, the most relevant legislative instruments within the European Union are the Regulation (EC) No 1107/2009 of the European Parliament and the Council of 21 October 2009 concerning the placing of plant protection products on the market and repealing Council Directives 79/117/EEC and 91/414/EEC [15] and the Directive 2009/128/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for Community action to achieve the sustainable use of pesticides [1].

According to our critical assessment of the above legal regulation, there are three main aims that are intended through the European Union's Common Agricultural Policy. Firstly, it is securing viable food production. Secondly, and inextricably from the first point, it is ensuring sustainable management of natural resources and climate action. Finally, the purpose of the European Union's Common Agricultural Policy is contributing to a balanced territorial development. These three objectives involve creating, sharing and implementing new knowledge, gained through the adoption and development of new technologies, and the incorporation of new products and new ways of organization and cooperation.

**Table 1.** European Union regulations and directives related to agricultural innovation and research.

Year	Type of instrument	Area of regulation
2013	Regulation	Establishing Horizon 2020 - the Framework Programme for Research and Innovation (2014-2020)
2009	Regulation	Placing of plant protection products on the market
2009	Directive	Establishing a framework for Community action to achieve the sustainable use of pesticides

These instruments are dealt with in detail individually in our analysis below, together with the critical assessment of their contribution to the maintenance of sustainable development while establishing bases for research and innovation in agriculture.

### **3.2 The Aims of European Union Regulations and Directives**

The Regulation (EU) No 1291/2013 of the European Parliament and of the Council of 11 December 2013 establishing Horizon 2020 - the Framework Programme for Research and Innovation (2014-2020) aims to “strengthen its scientific and technological bases by achieving a European Research Area [...] in which researchers, scientific knowledge and technology circulate freely, and by encouraging the Union to advance towards a knowledge society and to become a more competitive and sustainable economy in respect of its industry. To pursue that objective the Union should carry out activities to implement research, technological development, demonstration and innovation, promote international cooperation, disseminate and optimise results and stimulate training and mobility” [10].

The Regulation (EC) No 1107/2009 of the European Parliament and the Council of 21 October 2009 concerning the placing of plant protection products on the market and repealing Council Directives 79/117/EEC and 91/414/EEC aims to ensure “a high level of protection of both human and animal health and the environment and at the same time to safeguard the competitiveness of Community agriculture.

The Directive 2009/128/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for Community action to achieve the sustainable use of pesticides acknowledges that “[e]conomic instruments can play a crucial role in the achievement of objectives relating to the sustainable use of pesticides”, and therefore “[t]he use of such instruments at the appropriate level should therefore be encouraged while stressing that individual Member States can decide on their use without prejudice to the applicability of the State aid rules” [3].

Doctrinal legal analysis of the pertinent legal instruments thus shows that particular attention should be paid to the protection of vulnerable groups of the population, including pregnant women, infants and children. The precautionary principle should be applied and this Regulation should ensure that industry demonstrates that substances or products produced or placed on the market do not have any harmful effect on human or animal health or any unacceptable effects on the environment” [2].

## **4 Discussion - Strategic Management within the European Union**

Apart from the societal dimension and apart from bearing in mind that agricultural innovation goes hand in hand with employment policies and rural development, the plans for strategic management can be subdivided into two broad areas, i.e. the strategic management of natural resources and sustainable development and the strategic management of the creation of such environment that supports healthier plants and animals.

Therefore, even though the European instruments leave great flexibility upon individual member states with regard to the particular policies they will adopt, all of them aim at a single strategic management plan within the European Union.

#### 4.1 Resources Management

The European Union's strategic management of the use of resources is focused on the quality and availability of natural resources in European Union member states and in other areas which are interconnected with the EU member states in terms of trade related to agricultural innovation.

The first most important aspect of such strategic management is keeping the balance between productivity and environmental goals. This is done through various instruments, such as the "SME Instrument" produced by the European Commission: "Small and Medium-sized Enterprises that are EU-based or established in a country associated to Horizon 2020 can now get EU funding and support for breakthrough innovation projects with a market-creating potential under revamped SME instrument, which is rolled out as part of the European Innovation Council (EIC) pilot. The SME instrument will boost fast company growth and market-creating innovation thanks to staged funding and ramped up business acceleration services" [4].

**Table 2.** Resources Management as Part of Strategic Management.

Type of resource	Examples	Area of management
Availability and quality of natural resources	Lands, nutrients, water, biodiversity	Proper balance between productivity and environmental goals
Soils	Various productive ecosystem functions	Management of water use and more economical production
Genetic resources	Food and non-food systems	Diversification and meeting future demands in farming

The table above summarizes the areas of management and methods for supporting sustainable development as they are set forth by the European Commission's document entitled Strategic Approach to EU Agricultural Research Innovation [7].

Our above assessment can be summarized with the finding that the most important types of resources that are to be managed following the issue of the strategic paper in 2013 are lands, nutrients, soil, water, biodiversity and various ecosystem functions, including the processes of food and non-food systems. The purpose of management is thereafter to maintain a proper balance between productivity and environmental goals, the management of water use and more economical production, together with proper diversification and making sure to meet future demands in farming.

## 4.2 Healthier Plants and Animals

According to the European Commission, plant health is an important and essential component of biosecurity. The Commission's official policy is directed towards establishing shared EU rules on "plant health aim to protect crops, fruits, vegetables, flowers, ornamentals and forests from harmful pests and diseases (harmful organisms) by preventing their introduction into the EU or their spread within the EU. This aim helps to: contribute to sustainable agricultural and horticultural production through plant health protection; contribute to the protection of public and private green spaces, forests and the natural landscape" [5].

Moreover, according to the strategic paper, "resilient agriculture and forestry systems require robust plants and animals with increased resistance to pests and diseases. Tackling numerous and highly dynamic biotic threats will require integrated approaches and the development of a wide range of tools for prevention, monitoring, control and management of pests and diseases along with risk management strategies. This includes seeking alternatives to contentious plant protection products and antimicrobials. The establishment of links between health and other disciplines and aspects of production will be sought. In the area of animal production, one-health approaches will receive particular attention" [8].

## 5 Conclusion

Management and sustainable treatment of natural resources is a top priority for experts within the European Union as well as in other states which are either interconnected with the EU member states through economic activities or are directly affected by the environmental developments within the European Union.

Industries related to farming are undergoing rapid innovation processes. Farmers and foresters alike are dependent on the development and adoption of innovation techniques. Research carried out in agricultural industries is managed by detailed European Union's regulation, especially by instruments adopted in the last decade.

Legal regulation aids agricultural economic activities and the recently adopted legislative instruments will prove that innovation is not in discrepancy with sustainability and environmental stability.

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## Cross-border Transfers and their Role in Payment Systems

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**Abstract.** In 1995, the phrase "cross-border transfer" was used in the payment system for the first time. The payment service providers, later payment services, have got used to it quite quickly. The payment system started to be divided into domestic, foreign and then cross-border payments as the above concept was introduced. But over time the "cross-border transfer" has somehow disappeared from the "dictionary", in particular, of the banking service providers. The client, in terms of banks, or other providers of payments and payment services will learn that there are domestic (internal) payments, and then foreign (international) payments, in which exists the so-called SEPA (Single Euro Payment Area) transfers or payments. This paper seeks, following a search of expert resources on this subject, to use comparison method of source of law to reflect on whether the concept of "cross-border transfer" is already surviving and is legitimately neglected by banks or other providers of payment services or still has meaning for its clients.

**Keywords:** Cross-border Payment, SEPA, Directive, Regulation.

### 1 Introduction

In the area of international payments currently we meet various concepts, which are based on international trade practice or regulation in particular by European law. Banks as basic payment service providers within the implementation of funds from the payer located in one country to a recipient who is resident in another country then used for these transfers concepts as foreign payments or SEPA transfers, while increasingly moving away from the concept of cross-border transfers. The present state is trying to find the answer to whether it is justified real phenomenon consisting in the fact that the bank and, if necessary other payment service providers, cease to use this category.

### 2 Bibliographic Sources and Methodology

The authors in their research activities involved in the payment system, payment services and their application in practice for a long time. They devote significant attention on standing published in scientific journals or professional journals at least. They found that directly in the area of cross-border payments with EU-related links,

resp. EEA, the authors do not address too much. Several studies have been directed to this concept, but these studies have dealt, for example, with cross-border transactions carried out by mobile applications outside the EU [15] or retail payments, again outside the EU [20].

Other scientific papers deal in particular with so-called SEPA payments, which may be considered a subset of the term "cross-border transfer", but the basic parameter is their currency, which can only be EUR. For example, the authors Silva et al. [19], Huch [11], Jančíková [12], Jílek [13], Martikainen [14] and others. Cross-border transfers as well as SEPA transactions were dealt with by Schlossberger [16, 17] or Schlossberger, Budík [18]. However, it should be noted that SEPA transfers can also be applied within the national payment system of Eurozone countries.

The following text is therefore taken into account not only the knowledge of the above authors, but the authors of this paper considered them only as a source of opinions on such matter.

During the preparation of this paper the authors took advantage of the method of comparison, when the examination of phenomena and processes that are linked to the category of "cross-border transfer" came out of the official definitions laid down in generally binding EU legislation with links to national legislation in the Czech Republic with a view to examine whether the concept of "cross-border transfer" is already obsolete and has nothing to do with the professional terminology of payment and payment services.

### **3 Cross-border Transfer and its Delimitation**

The concept of "cross-border credit transfer" (or "cross-border payment") appeared within the framework of the European Parliament (hereinafter referred to as "EP") and Council Directive 97/5 / EC (hereinafter as "Directive 5") on cross-border transfers has been explained as: "Cross-border transfer means operations carried out at the initiative of the payer through an institution or its branch situated in the same Member State, which is intended to transfer the amount of money to the beneficiary to an institution or its branch located in another Member State; the payer and the payee may be the same person "[1]. Article 1 of Directive 5 then modified its application to the client transfers in the currencies of Member States to the equivalent of 50 thousand ECU.

Subsequently, Regulation (EC) No. 2560/2001 of the European Parliament and the Council on cross-border payments in Euro (hereinafter referred to as "Regulation 2560") was adopted within the EU and the term "cross-border transfer" also appeared there. It was listed as: "Operations carried out at the initiative of the payer through an institution or its branch located in one Member State for the purpose of money transfer to the payee into an institution or its branch in another Member State; both the payer and the payee may be the same person "[2]. When comparing both definitions, there is almost no content difference in them. Also Regulation 2560, Article 1 set the regulation limit of 50 thousand, but already EUR. Regulation 2560 included a "cross-border transfer" under the "cross-border payments" category, which included "cross-border electronic transactions" and "cross-border checks", in addition to cross-border transfers.

So far for the time being the European legislation of the concept of "cross-border transfer".

In 2002, the first comprehensive legal regulation of the provision of payment services and services related to the territory of the Czech Republic (hereinafter "CR") was published, which was reflected in the adoption of Act No. 124/2002 Coll., On Transfers of Funds, Electronic payment systems and payment systems (the Payment System Act), (hereinafter referred to as "ZPS 124"). Its effectiveness was set for January 1, 2003, with the effect that some of the provisions of this Act were expelled, at the time of the Czech Republic's accession to the European Union ("EU") or for January 1, 2004. Until then, some aspects have been modified, for example, in the then applicable Commercial Code (Act No. 513/1991 Coll, Commercial Code, abolished as of December 31, 2014); the Act on Banks (Act No. 21/1992 Coll., on Banks) or selected implementing decrees.

ZPS 124 in its § 1 defined what areas and activities it regulates. With regard to the focus of this contribution, we are particularly interested in the letter a) of this paragraph, which states that the law "... regulates the execution of transfers of funds in the Czech Republic in the Czech currency and the execution of cross-border transfers ..." [7] to the other provisions of § 2, para 2, which describes the term "cross-border transfer". The term was defined as: "... a transfer of funds from one EU Member State or State forming the European Economic Area (" EEA "- Ed. Author) to another EU member state or a state that is part of the EEA in the domestic currency of any EU Member State or State EEA forming up to the equivalent of 50 thousand euros. The counter-value shall be converted at the exchange rate announced by the European Central Bank on the effective date of the transfer order "[7]. This characteristic of the "cross-border transfer" in the Czech legislation directly included the threshold of 50 thousand EUR as one of the conditions, which did not apply in the context of European legislation. The European regulation was enough with a simpler concept that did not bind to any limiting boundary. However, the threshold of 50 thousand EUR was specified for the regulation of the services (transfers), but as a separate condition outside the definition of "cross-border transfer".

Therefore, the Czech cross-border transfer could be characterized by three basic conditions:

- transfer between EU entities, resp. EEA,
- in the currencies of EEA countries (eg EUR, CZK, GBP, and CHF thanks to Liechtenstein), and
- up to 50 thousand EUR, respectively the equivalent of the currency of the EEA countries to this level expressed in EUR.

With this definition, we basically stayed until 2009, when he appeared directly effective EU law under the name EP and Council Regulation (EC) no. 924/2009 on cross-border payments in the Community and repealing Regulation (EC) no. 2560/2001 (hereinafter referred to as "Regulation 924"). Before the effective date of this regulation, EP and Council directive 2007/64 / EC on payment services in the internal market amending Directives 97/7 / EC, 2002/65 / EC, 2005/60 / EC and 2006/48 / EC and repeals Directive 97/5 / EC (hereinafter referred to as "PSD1"), was published in

2007. PSD1 did not directly define the concept of "cross-border transfer", as it primarily codified the newly-established "payment service" concept, including the transfer of funds. Article 2 then defined the scope of the Directive, which was aimed at regulating of payment services within the Community, with the few exceptions contained therein [5]. It also stipulated that some assignments of the PSD1 concerned payment services provided only in EUR and the currencies of Member States outside the euro area. These included, for example, rights and obligations in providing of payment services. However, from the context of PSD1 came out that this regulation, which had to be transposed by all EU countries, EEA by November 1st 2009 at the latest, also concerned cross-border transfers. In Czech conditions, this was reflected in the adoption of Act No. 284/2009 Coll., On Payment System (hereinafter referred to as "ZPS 284") [8].

However, this was otherwise in Regulation 924. In its Article 2, it defined the notion of "cross-border transfer" but rather used the term "cross-border payment". It is considered: "... an electronically processed payment transaction initiated by the payer or the payee or via the payee where the payment service provider of the payer and the payee's payment service provider are located in different Member States" [3]. This definition in itself again contains no boundary that would say what can be considered a cross-border payment and what can not. From the context of Regulation 924, it can be stated that cross-border transfers may be in EUR but also in other currencies of the Member States of the Community. This conclusion can be drawn from Article 1, which states that Regulation 924 applies to cross-border transfers in the currency of EUR or in the national currencies of the Member States which have notified their decision pursuant to Article 14 of this Regulation to extend the application of this Regulation to their national currency. The Czech Republic did not use this option. Only Sweden and Romania [10] decided to apply Regulation 924 to the national currency.

With effect from Regulation 924, which was set for November 1st, 2009, the ZPS 284, which was the PSD1 transposition, became effective as well. As regards the definition of the term "cross-border transfer or payment", reference can be made to what was mentioned above about PSD1. ZPS 284 replaced the ZPS 124, but it was also canceled and replaced in January 2018 by another law (see below).

In 2012, another EU regulation was adopted, this time Regulation (EU) 260/2012 of the European Parliament and of the Council laying down technical and business requirements for euro payments and collection and amending Regulation (EC) No. 924/2009 (hereinafter referred to as "Regulation 260"). Again, this regulation includes the "Definitions" section, in which this term refers to "cross-border payment transactions". Those are determined as: "... payment transactions initiated by the payer or the payee where the payment service provider of the payer and the payee's payment service provider are in different Member States" [4]. Again, if we compare with the definition in Regulation 924, we will find that Regulation 260 has a content link to the concept of "cross-border payment", but instead used the more general meaning of "cross-border payment transactions". However, this Regulation 260 only regulates transactions executed in the euro currency, i.e. it regulates a certain "subset" of transactions carried out in the framework of cross-border transfers, due to the strong support of so-called SEPA payments, which can only be realized in the euro currency.

However, for all the above definitions of "transfers, payments or transactions" there is one thing in common - and that is the word "cross-border". Consequently, this concept still expresses a situation where entities - whether legal or individual persons - are transferring cashless or electronic money, if they have their seat in different EU countries, resp. EEA. However, it does not follow from the above definitions that cross-border operations should be only in EUR, or on the contrary. It is assumed that these payments in different currencies of EU member states, resp. EEA, and the selected European legislation aimed its control harder to operations in EUR.

The last important legal regulation that significantly regulates providing of cross-border payment transactions is also Directive 2015/2366 of the European Parliament and of the Council (EU) on payment services in the internal market amending Directives 2002/65 / EC, 2009/110 / EC and 2013/36 / EU and Regulation (EU) No 1093/2010 and repeals Directive 2007/64 / EC (hereinafter "PSD2"). Even this directive does not directly describe the "cross-border transfer, payment or transaction" but regulates providing of payment services which it has extended [6]. The directive had to be transposed by January 13, 2018 at the latest. In the Czech Republic, the new Payment System Act was published under No. 370/2017 Coll. (i.e. Act No. 370/2017 Coll., on Payment System, effective from January 13, 2018, hereinafter referred to as "ZPS 370").

Even in this Act, we can not find a direct definition of "cross-border transfer, payment or transaction" similar to ZPS 284. Law 370 primarily deals with regulation in providing of payment services and regulation of the providers themselves. One of the major payment services, however, is, inter alia, the transfer of funds from the payment account to which the payer, payee or payer orders via the payee issue a payment order (§3 (1) (c) and (d) ZPS 370) which can be considered as a transfer, payment or transaction. From the assignments of § 128 of the ZPS 370, it can be clearly deduced from these exceptions that this law regulates (if we use the terminology of Regulation 924, resp. Regulation 260), cross-border payments (transfers or transactions) that are payment services, both domestic and cross-border in all currencies of the Member States. Payment service providers may then use the assignment of this paragraph to declare that transfers of funds in currencies other than the currencies of Member States are not covered by the ZPS 370. ZPS 370 in Section 128 para 1 provides for a negative definition: "The Provider and the User can not, by agreement, deviate from the assignments ... ." [9] and further specifies the specific references to the relevant paragraphs of the ZPS 370. In the following paragraphs ZPS 370 then states that the selected provisions either do not apply or are not using their provider agrees with the user. Most payment service providers in the Czech Republic have used this option and put it into their terms. In particular, the deadlines for debiting the payment, the payment deadline and the non-application of the clause prohibiting the deduction of the payment transaction amount are respected.

## 4 Discussion

Therefore, it can be concluded from the presented comparison that the concept of "cross-border transfer, payment or transaction" still has a significant place, as the EU is interested in aligning as much as possible the conditions for providing of payment services in which transfers of funds are an integral part. The fact that the SEPA project has emerged since the beginning of the 21st century, has only highlighted the importance of approximating national and cross-border transfers denominated in this single or common currency. The word "cross-border" thus translates into a transitional situation until such transfers become essentially "national" or, more precisely, "intra-EU transfers, payments or transactions".

**Table 1.** Transfer of payment at the initiative of the payer from a payment service provider based in the Czech Republic.

Transfer type	Currency	Regulated by ZPS 370	Regulated by Regulation 924, resp. Regulation 260
Domestic	CZK	Yes	No
	EU currency, EEA without EUR	Yes	No
	EUR	Yes	Yes, if payer and payee provider is SEPA compliance.
	Other currency than mentioned above	No	No
Cross-border	EU currency, EEA without EUR	Yes	No
	EUR (other than SEPA payments)	Yes (also if it is not a SEPA member project)	Yes, if the recipient is in the country of the euro zone or the beneficiary's bank is SEPA compliance. If it is not SEPA compliance, then only partly.
	EUR - SEPA	Yes	Yes
Foreign	EU currency, EEA without EUR	No	No
	EUR	No	No

Notes to Table 1: The table does not take into account the decisions of Sweden and Romania under Article 14 of Regulation 924 [3].

The Czech Republic has not yet accepted EUR for its domestic currency. From this perspective, we have the situation of customers of banks and other payment service providers at the territory of the Czech Republic rather complicated, administratively at

least. That is a fact that the clients in the role of payer must, within their payment orders (demonstrated in the type of payments initiated by the payer) distinguish the following options - see Table 1.

At this point it is necessary to realize what the foreign payment is from the point of view of the above table - payment from a Community country (i.e. the Czech Republic) to a non-Community country in any currency, i.e. in EUR, other currencies of EU countries, resp. EEA and in other currencies.

So far, one country outside the EEA and whose banks as payment service providers are applying for SEPA is Switzerland. Even client payments from a payment service provider based in the Czech Republic to SEPA compliance providers are to be considered as SEPA payments (i.e. cross-border payments in EUR even though Switzerland is not an EEA country).

From the overview in Table 1, which is just a general example, it is important for payment service providers to distinguish and correctly state in their terms, tariffs, etc. whether they are cross-border or foreign transfers. In the context of the cross-border transfer, it is appropriate for providers, especially banks, to indicate whether they are providing SEPA transfers because that it is not the responsibility of non-euro area providers. This division is required because the ZPS 370 regulates only domestic transfers and cross-border transfers as regards the processing time for both so-called the "outgoing" payments and the "occurred" payments, as well as the prohibition of charging the transaction fee from the transfer amount. Deadlines and prohibitions are clearly set out in Law 370 [9]. Furthermore, cross-border payments are regulated by the Regulation, in particular those in EUR. It will mostly be SEPA payments, but it may not always be. Certainly, we can imagine a bank from the Czech Republic that is not a member of the SEPA project and who, for its client, makes a payment in EUR for example to a euro-zone country or another EEA country in EUR and therefore must comply not only with the rules of ZPS 370 but also with Regulation 924, resp. Regulation 260.

## **5 Conclusion**

The fact that the term "cross-border payments, transfer or transaction" is deleted from the bank's dictionary in the Czech Republic can be considered as erroneous and minimally misleading towards the client. For example, if a client of a major payment service provider learns that a transfer, for example, in a GBP to a UK-based bank is a foreign payment, it does not seem to him that the payee should, for example, receive the payment the next day benefit of his account, and that no fees can be deducted from this payment. The fact that banks in the Czech Republic (i.e. in a country outside the EMU) are burdening cross-border payment charges as foreign payments can be considered as legitimate including payments in EUR. The regulation of the amount of the payment charge in EUR is not applicable to them. Why, however, the EUR fee payment for many banks as payment service providers remains divided by the threshold of 50 thousand EUR, so there is no regulatory justification. It is only the business decision of such provider to burden the transfer over 50 thousand EUR by higher fee.

Within Eurozone countries, payments must not be distributed as such. In this area, the cross-border transfers in EUR, which are automatically all SEPAs, apply uniform charges in terms of the amount of national charges for payment in EUR.

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## Internet as a Tool for Local Government Communication with the Local Community – Selected Aspects

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**Abstract.** The article discusses the use of the internet and, in particular, websites and social media for the communication of the local government (city) with the local community. The content and relations between the interlocutors are very important in communication. Currently, the citizen is no longer barely a passive recipient of information shared on the Internet, but actively participates in virtual life. Cities should not be limited to presenting only messages, but to conduct mutual communication. The main goal of the article is to assess the use of the internet for local government communication, and above all, to analyze official websites of selected voivodship cities according to specified criteria (among others, information availability, interactivity and transparency were tested) as well as their profiles in social media. The analysis shows that the websites of selected cities are at an increasingly higher level. Cities use their websites mainly for informational and promotional purposes. It can also be noted that cities are increasingly deciding to diversify messages in various social media depending on, among others, the profile of their users or communicated content. Effective use of social media by local governments is to contribute, above all, to creating the desired image and improving the quality of communication, especially with groups that are difficult to reach via traditional media. Currently, the profiles of self-governments in social media serve primarily image-building activities, encouraging participation in events or social consultations. Literature analysis, internet sources, comparative analysis, WAES and case analysis were used as a research method.

**Keywords:** Internet, Local Government, Communication, Local Community, Social Media, Website.

### 1 Introduction

The rapid development of various means of communication has contributed to the fact that information has become a valuable and wanted good. The Internet allows you to widely spread information about your offer, regardless of geographic and temporal barriers, giving them a global dimension. The rapid growth of Internet users means that the flow of information on the network also increases. It is important to care about the quality of information provided by websites. The Internet allows for quick response to events taking place in the environment of a given entity without any delays, it enables

continuous, interrupted flow of information. It is therefore treated as one of the basic and perspective ways of communication between local government offices and its community. Local government websites should offer not only basic information that can be found in the obligatory Public Information Bulletin, but also data enabling the user, among others gaining knowledge about the advantages of a given commune, the prospects for its development, encouraging to visit it or invest in it, allowing to feel a common bond, the atmosphere of a given place or to facilitate certain activities. The websites of the offices of local government units are primarily of a communication, promotional and optional nature, while the Public Information Bulletins created by virtue of law are primarily obligatory and fulfill informative functions related to the presentation of the scope of activities and competences of self-government bodies. Local governments, in addition to their websites, are trying to increasingly use other forms of communication with their recipients via the Internet. Social media are becoming very important forms of communication, gathering people interested in the relevant subject. Currently, the profiles of self-governments in social media primarily serve image-related activities that encourage participation in social events or consultations.

The article discusses the use of the Internet, especially websites and social media, to connect local council (city) with the local community. The main goal of the article is to evaluate the use of the Internet for local government communication, and above all, to analyze the official websites of selected cities according to specific criteria and as their profiles in social media. Effective use of social media by local governments is to contribute above all to creating the desired image and improving the quality of communication, especially with groups that are difficult to reach through traditional media. The article uses literature analysis, internet sources, comparative analysis, WAES and profile analysis in social media.

## **2 The Importance of the Internet in Local Government Communication**

The Internet creates a new quality of marketing communication enabling the collection, storage, processing, presentation and transmission of information between the sender and the potential recipient of the message [4]. The feature of the Internet is interactivity, which can be specified in two levels [9]: interaction with the medium (the user, in order to receive the selected information, must actively participate in the communication process, e.g. click on the selected place) and social interaction (interaction between people, sharing opinions, interests). As an interactive medium, it enables quick response to the expectations and needs of recipients, allows feedback [17]. This is the basic and the most important feature that distinguishes the global network from other media. The Internet can be described by five words, 5C: communication, commerce, convenience, community and content. An important feature of the Internet is the immediate transmission of information, without any delay, immediately after their occurrence, regardless of the time of day or year, 24 hours a day. Four forms of

information flow using the Internet can be distinguished, which complement each other [7]:

- allocation – where the information simultaneously propagates from the center to many peripheral recipients; the sender has a privileged position here defining the time and place of communication; the message is unidirectional, with no possibility of feedback, e.g. mailing;
- conversation – units interact directly with each other, omitting the possible center and intermediaries; independently select partners and the time, place and topic of communication; internet forums are an example here, where internet users exchange information, discuss it;
- consultation – the participant looks for information in an information center, e.g. on a website; via e-mail, communicator contacts the representative of the entity to clarify doubts or obtain information; the recipient chooses the time, place and subject of communication;
- registration – the reverse of consultations; the center "demands" information from the recipient (not always with his consent or awareness); is used to create registers, databases, etc.

The Internet allows local governments to personalize the content and better identify customers, so you can better match the offer to their needs. The benefits include accuracy, speed, enhanced communication, increased productivity, and acquisition of skills and knowledge [3]. A popular way of obtaining information is cookies or registration forms in which users provide their data. Estimating the size of information resources on the Internet is almost impossible, some even think that if there is something on the web, it probably does not exist. Despite the undoubted advantages, the Internet also has disadvantages or barriers to its use. An important threat is, among others lack of full security of using the network services, lack of data protection, computer viruses, piracy, impersonating other people, which contributes to the low level of Internet trust. An unfavorable phenomenon, which is also the advantage of the Internet, is the freedom of speech and access to a vast content. The Internet user feels anonymous because the network does not require real data. Internet spamming is also an obstacle to Internet communication. Local government must deal with the rapid growth of technology and the increasing complexity of running a locality without ignoring the pressing issues facing the communities they represent.

Information technology has made it easier for local governments to provide information to their citizens and to handle information, communication, and other important management concerns [12]. Local government administrators must understand the power of technology and acquire the necessary knowledge and skills [5]. Website (World Wide Web) is a kind of information service for which the medium is the Internet. It can consist of many thematic collections, grouped by, e.g., time (past, present, future), space (issues related to the entire structure of the entity, regional branches, etc.), events, markets and other key words to facilitate and improve information management [22]. The essential components of an effective website include, above all, content, community and commerce. The most important thing here is the content, the usefulness of the content from the point of view of the website visitor

and their timeliness. Services outside of static content often have a news section and the ability to log in and remember recipients' preferences in order to tailor the content to individual preferences. Added value can be created by interactive elements, such as the possibility of sending e-cards, organizing contests, games, sharing places where users can conduct real-time discussions, forums, offer films, posters, sound files related to a given place / entity. Please note that the website is not a website. A page is just a document displayed in the user's browser. The website may contain hundreds of pages. WWW is often wrongly identified with the entire Internet, in fact it is only one of its most popular services. D.C. Arnott and S. Bridgewater distinguished three categories of websites in terms of marketing functions [2]:

- information sites whose main task is one-way communication,
- support sites that help you create and maintain relationships:
- transaction websites that enable comprehensive information exchange and individualized transactions.

In territorial self-government units, depending on the level of communication between the office and the recipients as well as the type and complexity of services provided, four basic levels of website development were distinguished: information (dissemination), one-way interaction (electronic forms sharing), two-way interaction (handling forms and their authorization) and transaction (applies to all activities necessary to resolve an official matter electronically). The goal of the e-Europe initiative, implemented by the European Union, is to create an online administration, which allows improving the efficiency of local government administration in the provision of services, simplifying the handling of official matters, as well as obtaining information about them. In the EU, the concept of eGovernment is primarily antonym of bureaucratic functioning of public administration.

Virtual communities are also very important in online communication, which for their members are a source of information, sense of belonging and social identity. Probably the author of the first definition of these communities was Howard Rheingold, who described them as a group with two important features: emotional involvement of participants and a sufficiently long time of action [18]. P. Wallace [21] divides virtual groups according to the type of contacts between their participants. On the one hand, these are groups consisting of people who know each other personally, for whom the virtual environment is only a communication platform in the breaks between personal meetings. On the other hand, there are groups whose members have met in the virtual world and only want to communicate in this way. In the middle there are groups whose members have met in the world of the Internet because of, for example, common interests, meeting also in reality. Most often such a virtual place consists of: a discussion forum, a chat, a calendar of events, an e-newsletter, and other elements thanks to which users with common interests or traits may have mutual contacts. Social media create a new communication channel that enables a constant presence of a given entity in the network, promoting the image, taking a position on important issues, dispelling doubts, etc. The breakthrough moment of their development is 2006, when Wikipedia and MySpace reached the peak of popularity, YouTube service appeared, there was also a significant increase in interest in Facebook created in 2004 [1]. Many

reports point to the continuous development of social media. Social media are highly regarded as a beneficial communication tool for local governments. Four primary themes are: dialogue promotion, engagement, unconstrained, and barriers. The first three themes focus on the opportunities that social media provide the local governments to communicate with citizens and the fourth theme presents the challenges faced by local governments that utilize social media [see: 8]. Social media are usually associated primarily with social networking sites and blogs, in fact they cover more forms. You can meet different classifications of social media. One of the more known divisions is authored by A.M. Kaplan and M. Haenlein, who used two dimensions: the level of self-presentation and the degree of disclosure (self) and the level of social presence that the given medium allows (Fig. 1).

		Social presence/media richness		
		low	medium	high
Self presentation /self disclosure	high	blogs	social networking sites (e.g. Facebook, Twitter)	virtual social worlds (e.g. Second Life)
	low	collaborative projects (e.g. Wikipedia)	content communities (e.g. YouTube)	virtual game worlds (e.g. World of Warcraft)

**Fig. 1.** Classification of social media [11].

It can be seen that many of these media operate on several levels of social interaction, i.e., they should fall into several categories at the same time. For example, Twitter is not just a microblog platform, it also serves to exchange broadly understood information. YouTube is a great tool for both informing and providing entertainment. Margo [14] asserted that social media takes its importance from its characteristics that include: participation, collaboration, empowerment, and time. Klischewski [13] argue that social media needs to maintain the relationship between citizens and their government; this needs self-discipline to effectively and consciously use such media in a free and open way. Local governments can create a community around their region, a place. Having such a community emotionally connected with a given region is a significant opportunity. Users of social media usually share interesting content, important and fun content. Internet users look for knowledge, information and opinions on topics that interest them. Some of them comment, evaluate or speak on forums. The purpose of using these media by self-governments may be to increase awareness or recognition of the region's brand, although it is often shaping opinions on a given topic and providing information about events. Attracting a certain number of users is one thing and keeping them at home is the second: members can exchange opinions, give new ideas, and provide a lot of information. The virtual community provides valuable information about the needs and problems of community members. Everyone in the group has free access to creating and receiving content. The contents are spread by social interaction and are constantly available. Once created, the content can be processed, edited, aggregated or quoted indefinitely. Local governments disseminate

the information to the public and thus information become available to all; this enables citizens to participate and collaborate with each other [16].

### **3 Website Analysis and Use of Social Media in Selected Cities**

To ensure high quality of communication through websites, they should be periodically evaluated. The scope of the evaluation must refer primarily to the content of the presented information, their legibility, relevance, ease of navigation (navigation), transparency of the website and usefulness of information for the user. One of the easiest ways to evaluate websites is to answer five key questions [19]: Who (who?) Is the creator of the site? What's the (what?) Site? When (when?) The site was created? Where does where the information on the site come from? and why (why?) should you use this site? One of the most formalized forms and known website rating systems is the Internet-Based Website Evaluation System (WAES) developed by the Cyberspace Policy Research Group, and the initiator of the work was the University of Arizona. The strictly defined simple criteria are divided into two categories: transparency and interactivity/availability. Over 20 attributes are checked in each category. The first one determines the effort taken by the office to make the information available to the citizen through the website, and the second one for the user's ease of obtaining information published on the website [15]. The WAES method is carried out using a binary method. It is determined whether a given attribute exists (value "1") or not ("0").

Random official sites of Polish cities were selected for the study, the population of which amounted to at least 100,000 (there were 39 of them as per 1.01.2018), created by municipal offices. The proportional selection was used depending on the number of inhabitants, broken down by GUS statistics [10] 1 city over 1 million inhabitants (Warszawa), 1 from the range of 500,000 to 999,999 (Łódź), 2 from 200,000 to 499,999 (Częstochowa and Bydgoszcz) and 3 from 100,000 to 199,999 (Bytom, Olsztyn, Opole). Domain names are easy to remember and usually consist of the abbreviation www, the name of the city and the extension of pl, sometimes eu. When the user wants to be sure that he has reached the official website of the city he title should contain words such as "city hall" or "official." The results of conducted analysis according to the criterion of "transparency" are presented in Table 1, while referring to the category of "interactivity" in Table 2. It should be emphasized that a lot of information was on the BIP – Public Information Bulletin website of the given office, while some inquiries opened additional websites, especially those related to tourism.

**Table 1.** Evaluation of selected cities' websites in the category of "transparency".

Evaluation criteria	Warszawa	Łódź	Bydgoszcz	Częstochowa	Bytom	Opole	Olsztyn
A clear page layout has been provided indicating that the office is the owner of the website content	1	1	1	1	1	1	1
The date of the last update of the site was posted, which indicates its current updating	0	0	0	0	0	0	0
The postal address of the office is provided	1	1	1	1	1	1	1
Postal addresses or telephone numbers for office employees have been provided	1	1	1	1	1	1	1
The e-mail address of the person responsible for the technical service of the website/service (webmaster) is included	1	1	1	1	1	0	1
An e-mail address has been placed for at least several employees of the office, to organizational units	1	1	1	1	1	1	1
The structure of the office is shown in a graphical form	1	1	0	0	1	0	0
Documents describing the rules of the office's functioning are included	1	1	1	1	1	1	1
The related addresses/links of other offices closely related to the given office are provided	1	1	1	1	1	1	1
There are other related non-governmental addresses of information sources	1	1	1	1	1	1	1
All downloadable or printable publications for free	1	1	1	1	1	1	1
A breakdown of the content depending on the recipient (e.g. resident, tourist, investor) is provided, which allows them to be personalized	1	1	1	1	1	1	1
Information on the administrative work of the office (including opening hours, commune authorities) has been provided	1	1	1	1	1	1	1
Basic information is provided, such as emergency telephones, pharmacies on duty, health care information	1	1	1	1	1	1	1
A city map, maps of the region are provided	1	1	0	1	1	1	1
A schedule of public transport/links to the relevant site is provided	1	1	1	1	1	1	1
<b>The sum of points</b>	<b>15</b>	<b>15</b>	<b>13</b>	<b>14</b>	<b>15</b>	<b>13</b>	<b>14</b>

It can be seen that in the category of "transparency" almost all offices received the highest grade – the highest grade received the office in Warszawa, Bytom and Łódź (15 points out of 16 possible). The results were similar. As for the criteria of "interactivity", here the offices fared less favorably – the best was the office in Warszawa, Opole and Olsztyn (14 points out of 17 possible) and the worst in Łódź and Częstochowa (12 points out of 17 possible).



**Table 2.** Evaluation of selected cities' websites in the category of "interactivity".

Evaluation criteria	Warszawa	Łódź	Bydgoszcz	Częstochowa	Bytom	Opole	Olsztyn
Searching of archived bulletins, regulations, regulations and requirements was made possible	1	1	1	1	1	1	1
The office does not use information gathering techniques, such as cookies, to collect information about visitors	0	0	0	0	0	0	0
An e-mail link was added to the highest official at the office	0	1	1	1	1	1	1
The thematic topics related to the online service (interactive elements), such as huts, mailing lists, are included	1	0	0	0	0	0	0
Contact with interested people via social networks was made possible	1	1	1	1	1	1	1
A link to subunits/cells inside the office is provided	1	1	1	1	1	1	1
Any forms required to submit forms to download are provided	1	1	1	1	1	1	1
It was possible to fill and send at least several online forms	1	1	1	1	1	1	1
Access to the site in a language other than Polish was allowed (at least one)	1	1	1	1	1	1	1
Access to the site was allowed in at least three languages other than Polish	1	0	0	0	0	1	1
There are also facilities for using the site for people with disabilities, for example, poorly seeing, deaf and mute	1	1	1	1	1	1	1
A sitemap has been provided as additional navigation	1	0	1	1	1	1	1
An e-mail newsletter/newsletter order was enabled	0	0	0	0	1	1	1
An internal search engine has been placed	1	1	1	1	1	1	1
A catalog of services/cases is provided with an explanation of how and where they can be arranged	1	1	1	1	1	1	1
An electronic inbox has been placed	1	1	1	1	1	1	1
Frequently asked questions have been posted	1	1	1	0	0	0	0
<b>The sum of points</b>	<b>14</b>	<b>12</b>	<b>13</b>	<b>12</b>	<b>13</b>	<b>14</b>	<b>14</b>

It can be noticed that generally in the area of the analyzed criteria, the examined offices achieved very high scores, obtaining 26–29 points out of 33 possible. The best position was obtained by the office in Warsaw, and the office in Bydgoszcz and Częstochowa was weaker among the analyzed cities. It should be emphasized that the differences resulted mainly from sharing information in other languages than Polish, and the possibility of ordering a newsletter, placing a graphical form of the office structure or answering frequently asked questions. Mostly, information for residents was only in Polish, while for tourists or investors there was an option in another language, mainly English. For example, on the Olsztyn website, although there was information about the

use of other languages, unfortunately only some of the content was translated. The tourism page was in four foreign languages: English, French, German and Russian.

The office's website should be interactive, and integration of all office databases should take place. For this reason, it is worth to include electronic forms to be downloaded in order to improve the communication process with its recipients. It can be seen that among the analyzed offices, everyone made certain forms available. Some of them could be filled in online and sent, but most often it was done via the ePUAP platform, to which one had to log in first. All sites used the cookies option, although it should be emphasized that the users were informed about the possibility of their exclusion.

Few offices made it possible to order a (e-)newsletter. All office interactions with clients also focused on social networks, such as FB, Instagram, and Twitter. Chats or other discussion forms were mostly active only during the designated periods e.g. in public consultation. It could at any time turn to the office through various contact forms or by e-mail. However, the criterion of interactivity is not fully implemented by the websites being researched, which serve rather informational and promotional functions. The interactive element on the website was, for example, a virtual walk around the city (Olsztyn) or an interactive internet service of the spatial information infrastructure (Bytom). Some pages were not very legible, due to the chosen arrangement of tabs or colors. Often there was a division into relevant sections, depending on which recipients were targeted, e.g. residents, investors; there was a division depending on the given case. Facilities for disabled people primarily referred to contrast and font changes. It could not find information about updating your site, although you could see that information is being transmitted as much as possible.

Apart from creating your own communities around a given commune, the presence of local governments on popular portals, such as Facebook, Instagram, or Twitter, is no longer surprising. Self-governments have different approaches to handling social media. Some create new posts, others appoint coordinators. Social networks enable differentiation of content depending on the group of recipients. The popularity of new portals, the development of mobile devices (including the increase in the popularity of smartphones) and the reduction of Internet costs should translate into communication activities undertaken by local governments. Local governments are trying to be in many social networks, not only on popular Facebook, especially because these websites are different. Google+ differs from FB primarily in that it is more intimate; Twitter offers writing and tracking posts not only from friends but also from famous people; Instagram – a service that allows you to take advantage of the camera's advantages and show what you are doing at the moment, or Pinterest – a virtual cork board to which the surfer can attach whatever you want: from stimulating quotes and articles, through photos and drawings, to music and movies. Most often Twitter, Facebook, NK or Google+ serve local governments to establish relationships mainly with residents, and YouTube, Pinterest and Flickr – to present values, events, using for this purpose multimedia materials (films, photos). The problem in communication through social media is sometimes the excess of messages sent by the local government to its recipients or the treatment of this type of media as a website. The main types of materials published by local governments are: information on important events (eg

sports events, concerts), news from the city life (e.g. traffic problems), announcements of cultural and entertainment events, links to other websites, trivia about the city, competitions, surveys and multimedia materials. It is also very important to make portals more attractive by enabling users to interact. Local governments encourage by suggesting participation in competitions, publishing photos sent by fans, encouraging them to share their experience, photos, voting for the most beautiful flowered balcony, etc.

Table 3 contains information on the possession of an official account of analyzed cities in the social networks indicated by them and the number of likes and tweets, as well as the number of followers and posts.

**Table 3.** Presence of selected capitals (official accounts) on social networks (as at 28/11/2018).

City	Facebook		Twitter		Instagram	
	Number of followers	Number of likes	Number of followers	Number of tweets	Number of followers	Number of posts
Warszawa	193,728	193,647	261,900	21,400	20,000	1,036
Bytom	14,333	14,406	814	1,160	–	–
Łódź	293,571	293,828	4,635	3,609	40,400	2,673
Olsztyn	22,895	22,968	2,364	6,387	3,785	221
Opole	32,556	32,843	765	66	–	–
Bydgoszcz	101,410	102,607	2,837	3,929	9,804	258
Częstochowa	12,625	12,679	–	–	4,249	1,373

It can be seen that the most popular social networking site is FB, Twitter and Instagram. The size of the city has only a partial impact on the use of social media. The specificity of the city and the image are its image also. It is worth to appreciate unofficial profiles created most often by enthusiasts of a given place, because sometimes they enjoy greater popularity than official ones. An example of such a phenomenon is even Warsaw (the official account has over 196,663 likes, and the unofficial web site of the capital "Warsaw Unknown" 262,485). Local governments also increasingly use multimedia materials, e.g. on YouTube. The video channel is very efficient – it requires relatively little user effort, and triggers a lot of attention and interest. The city of Częstochowa, due to the nature of the recipient, also has an account on the Polish website Nk. Bytom has an account on Pinterest. According to the Sotrender report on Facebook activity from October 2018 [6], the biggest fanpages were: Łódź, Nieznana Warsaw and Kraków PL. The greatest number of storytellers involved parties: Łódź, Kraków PL and Wrocław [Wroclove]. The best posts were seen on Łódź. On Twitter, according to Sotrender data from October 2018 [20], the number of followers is the highest for Warszawa, Wrocław and the City of Gdańsk.

## 4 Conclusions

It can be noticed that local governments use the Internet more and more effectively. The website provides the necessary information and virtually officially can handle

official matters. It is an appreciated tool for creating the image of a given city. It should be emphasized that the groups of recipients expect different information, and considering the official side, the local community, and mainly the inhabitants, is an important group. The analysis showed that the websites of selected cities are at an increasingly higher level. All provided information about the office's work and contact details for departments or responsible persons and enabled contact via an electronic inbox and handling of some of the online cases. Sometimes it was not possible to use online communication with the office directly from the website, and not only through social media. It is also worth considering other language versions, although it should be emphasized that in the case of information intended for tourists or investors, you can see a wider choice of language.

It can be seen that the majority of local governments use the most popular social channels (Facebook, Instagram, YouTube, Twitter) - mainly for communication with residents. Social media change the rules of communication between them and their recipients. Currently, profiles serve primarily image-building activities, encouraging participation in events or social consultations. Effective use of these social media is to contribute above all to creating the desired image and improving the quality of communication, especially with groups that are difficult to reach via traditional media. It is not an easy task and it is time-consuming. Having an idea for a city image in social media should be carefully planned, because such profiles should be led by people who understand the recipients and speak their language. Social media require rapid response, and the city is a living and dynamically changing organism. Instagram and Snapchat (which is visible, among others, in the USA), as well as Twitter, are becoming more and more popular, mainly among those who care about the tracking of news. These social media are mainly selected by the youngest internet users. The most engaging content on all social media platforms (not only on YouTube) is video – also live broadcasts. This trend should be properly used.

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## **Satisfaction and Commitment in Work in the Opinion of Employees of the X and Y Generation (on the Example of the Health Care Sector and the Financial Sector in Poland)**

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**Abstract.** Satisfaction with the job is one of the main factors determining not only the choice of the workplace, but also the desire to stay in the organization. The level of job satisfaction is related to the level of involvement of a given employee in it. This involvement significantly influences the success that the organization can achieve. Contemporary human resource management is a difficult task for the organization's managers. An additional difficulty is the increasingly visible generational difference in organizations. Generation X and Y differ not only in mentality and professed values, but also in the approach to work and tasks. The purpose of this article was to identify the level of self-commitment and job satisfaction performed by employees from generation X and generation Y. The authors additionally examined whether there is a relationship between the level of job satisfaction and commitment. The survey was conducted among 89 employees employed in enterprises operating in Poland in the health care sector and in the financial sector.

**Keywords:** Job Satisfaction, Commitment in Work, Generation X, Generation Y.

### **1 Introduction**

The contemporary labor market is undergoing significant and dynamic changes. It is affected not only by economic conditions but also by the diversification of the population structure of people who are professionally active. What is more often observed is the phenomenon of the appearance of so-called generations of employees. The concept of a generation can be explained as a group of people of similar age who during the course of their lives witnessed the same events [2]. These generations are represented by people of different ages, with different skills, personality traits or different expectations towards work and responsibilities associated with it. The literature on the subject assumes a division into four generations: Baby Boomers

(born in 1946-1969), generation X (born in 1970-1979), and generation Y (born in 1980-1994) and generation Z (born after 1995) [3].

The emergence of different generations in the labor market is a big challenge for managers who need to manage this generational diversity in an appropriate way. In addition, in order to avoid high employee turnover, they need to take action to make employees more willing to remain in the organization. Such activities include building broadly understood employee engagement and stimulating the level of job satisfaction achieved by them [11].

Satisfaction with the work performed largely reflects the employee's attitude towards the tasks being performed. It is defined as positive feelings about the work being done. It also talks about the fact that the employee willingly performs his tasks because his work is carried out in accordance with his interests. In turn, commitment to work is defined as the individual's willingness to give up personal goals for the professional activity and organization in which he is employed [4].

The purpose of this article was to identify the level of self-commitment and job satisfaction performed by employees from generation X and generation Y. The study was conducted in two companies operating in Poland. Due to the mystery of the study, the authors have committed not to give the names of the surveyed companies. The first of the surveyed enterprises operates in the public health sector, while the second is a private sector enterprise [6].

## 1.1 Generation X and Y

Modern management becomes a more difficult and complex process. An important challenge faced by the managers of an enterprise is the management of human capital. This capital is the main factor thanks to which enterprises shape their level of competitiveness on the market. In order for the company to achieve above-average results, it should first of all ensure the employment of personnel with appropriate competences. The level of employee involvement as well as their attitudes vary depending on their age. Among the people employed in the company, each generation is distinguished by different features, so to be able to manage their involvement as well as influence the level of their satisfaction, it is necessary to know the determinants that influence the behavior [15]. Table 1 shows the characteristics of the X and Y generation that influence engagement in work.

**Table 1.** Characteristics of the X and Y generation [8, 14, 15].

	Generation X	Generation Y
Basic values	Balance, good education, entrepreneurship, independence, seeking work-life balance, pragmatism, independence, skepticism	Attitude for achievement, self-confidence, diversity, consumer enthusiasm, high tolerance, high level of education, optimism, realism
Approach to money	Caution, conservatism, saving attitude	Earning in order to be able to spend

Work ethics	Approach - "work smarter and more efficiently, but no longer", self-sufficiency, focus on single-tasking, results orientation, preferred loose work environment	Ambition, multitasking, persistence, entrepreneurship, obsession with personal development, high expectations towards superiors, goal orientation, striving for development in teamwork
Communication	Using a simple conversation - presenting facts, immediate, direct approach, avoiding abbreviations and company jargon, using e-mail as a key means	Courtesy, direct communication only if the message is very important, positive attitude, preferred electronic way of communication
Feedback and rewards	Self-sufficiency - concrete instructions are enough to overcome the need for control, freedom at work is the best reward, remuneration through free time, greater interest in non-financial remuneration, low value of public recognition	The willingness to receive frequent feedback, constant control, a high need for recognition, the need for clearly defined goals and expectations
Approach to career	A proactive approach to the development of one's qualifications through the acquisition of academic degrees, participation in trainings, seminars, not necessarily related exclusively to the position held	Entering the labor market with a lot of knowledge is characterized by their lack of experience. Big desire to develop their own skills

Table 1 shows that the difference in personality traits of given generations occurs in all groups of presented features. Generation X is distinguished by independence conservative approach to work focus on direct communication and awareness of the importance of qualifications. In turn, the generation Y is characterized by self-confidence, multi-tasking, the need for frequent feedback and focus on the development of its competences, especially those focused on industry knowledge, foreign languages and specialized computer systems [10].

A particular difference between the generation X and Y is the approach to the implementation and use of modern technologies. Generation X may be referred to as "digital immigrants" [2]. Although representatives of this generation treat the media as an important means of communication, they are not proficient in using new technologies. The reason may be the fact of growing up without digital solutions that were available to representatives of the Y generation during their youth period [1].

Adolescence has the greatest impact on the attitudes with which employees are guided in their professional lives. People from the older generation pay more attention to punctuality and to treating earned money with greater respect. The reason is the circumstances in which they were growing up. They did not have mobile phones to inform other people about the expected delay, so the agreed time and place were



binding. They did not grow up in the era of developed consumerism which is why their approach to money is more conservative. The generation Y is taught that money is an inseparable element of the use of life. The fact is that most of them are convinced that they work to be able to spend [13].

Therefore, the specific characteristics can be reflected in the advantages and disadvantages of each generation representatives (tab. 2).

**Table 2.** Advantages and disadvantages of representatives of the X and Y generation [14].

	Advantages	Disadvantages
Generation X	<ul style="list-style-type: none"> <li>• Loyal to the employer,</li> <li>• prefer stabilization,</li> <li>• conscientious,</li> <li>• humble,</li> <li>• appreciate their situation</li> <li>• interested in innovation and the development of the workplace</li> <li>• Patience,</li> <li>• Involvement,</li> <li>• readiness to make sacrifices,</li> </ul>	<ul style="list-style-type: none"> <li>• Difficulties in adapting to new work environments</li> <li>• Low mobility due to poor foreign language skills</li> <li>• Attachment to traditional forms of work</li> <li>• Treating work as the most important part of life (workaholism)</li> </ul>
Generation Y	<ul style="list-style-type: none"> <li>• Natural ability to use new technologies</li> <li>• High mobility</li> <li>• Multitasking - perform a few things at once</li> <li>• Ability to work in a team</li> </ul>	<ul style="list-style-type: none"> <li>• Lack of ability to solve non-standard problems</li> <li>• demanding attitude</li> <li>• Unrealistic expectations</li> <li>• Lack of patience</li> <li>• Low work ethic</li> <li>• Difficulties in interpersonal communication</li> </ul>

Basic differences can also be seen in the advantages and disadvantages of individual generations (tab. 2). Generation X is usually more conscientious, humble and has more patience in performing tasks. Assigning such features may result not only from the age in which there are employees of the X generation, but also from their professional and life experience. The greatest advantages of the Y generation can be their natural mobility and the ability to use new technologies. Generation Y are young people who do not have a specific life plan yet, and therefore often travel trying to find a suitable place for themselves. However, despite possessing advantages that are important from the point of view of the modern organization, the Y generation is very demanding. Employees of this generation expect high earnings, flexible working hours and other supplements that are not always adequate to their professional experience. In turn, the generation X is attributed to such disadvantages as: too much attachment to traditional forms of work and a negative approach to the implementation of innovative technologies.

## 1.2 Commitment and Satisfaction from Work

Work is an essential element in the life of every human being. It provides not only the opportunity to maintain oneself and the family but also affects human development. There are many definitions of this concept in literature, but there is still a belief that job satisfaction is a multidimensional concept that is difficult to define [17]. According to A. Wołowska, the concept of job satisfaction is a sociopsychological term and means a component of two types of satisfaction: general - which involves an emotional approach to work, and also a particular one - which refers to a specific factor resulting from work [16].

It should be noted that the concept of job satisfaction and the concept of satisfaction are not the same. The main difference that proves this is the time of occurrence of these phenomena. Satisfaction may be temporary, while the feeling of satisfaction is usually associated with a long period of time (tab. 3) [17].

**Table 3.** Factors affecting the level of job satisfaction [7, 16].

Personal	Social	Organizational
- needs	- organizational culture	- amount of remuneration
- age	- compliance with ethics	- a promotion opportunity
- sex	- relations with superiors	- the possibility of development
- experience	- cooperation with employees and clients	- working conditions
		- the content of the work

Knowledge of the level of job satisfaction is necessary to properly shape the level of employee involvement. This commitment is one of the most important factors that significantly affects the organization's success. There are many definitions and publications referring to employee involvement [7]. According to J.M. Moczydłowska, commitment "is an emotional attachment to the goals and values of the organization, to the role of the individual related to the implementation of these goals and to the organization itself for its good" [9]. Another definition of employee involvement is proposed by K. Kulikowski, who understands it as a particularly strong relationship with the effectiveness of tasks performed by employees [5]. There are three basic types of commitment: affective, duration and normative (tab.4) [12].

**Table 4.** Types of employee commitment [12].

Affective	Duration	Normative
- otherwise called emotional	- it is the feeling of an	- it is understood as a belief that
- determines to what extent the employee wants to stay in the organization in which he is employed	employee saying that work towards the organization is his duty	undertaking activities related to changing a workplace entails high financial and economic costs
- an employee involved affectively identifies with the company's values		

## 2 Methods

The purpose of this article is to identify the level of involvement and job satisfaction performed by employees from generation X and generation Y. The article adopted the following time frame: generation X - born in 1970 - 1979, generation Y born in 1980-1990. The study was conducted in two companies operating in Poland. The first enterprise is a hospital operating in the public health care system, while the second is a company from the financial sector related to the activities of banks. The survey was conducted using the original questionnaire. The survey includes questions about the level of self-commitment and the satisfaction of the job. Respondents assessed the issues addressed using a 6-point scale, where 1 meant complete lack of commitment or job satisfaction, and 6 - a very high level. Basic statistical measures such as mean, dominant, standard deviation and coefficient of variation were used to analyze the obtained research results. It was also checked whether there is a relationship between the level of own involvement and satisfaction, taking into account individual generations of employees. The characteristics of the research sample are shown in Table 5.

**Table 5.** Types of employee commitment [12].

	Health care sector		Financial sector	
	Generation X	Generation Y	Generation X	Generation Y
Number of respondents	31	16	28	14

Medical sector is one of the most important and most specific sectors operating in the country. This specificity consists in particular in regulating its activities with many legal acts. The main problem faced by managers of medical facilities is the shortage of personnel. Employee management in health care is a challenge for its decision makers. It should be noted that resource organizations are not only people, but the knowledge possessed by them. Appropriate management of human capital should apply not only to business entities, but also to public entities. The lack of adequate human resource base can make the functioning of the state in doubt.

A different example is the financial sector. There are usually large private enterprises operating in this sector, where the remuneration of employees is sometimes much higher than in the health care sector. The rationale for the choice of the financial sector is the possibility to compare the results of research between employees in the public and private sectors. It should be noted that despite different working conditions and the amount of employees' remuneration in the analyzed sectors, in each of them the most important resource is a human being. Therefore, in each of the sectors discussed it is necessary to properly manage human capital, especially the level of commitment and satisfaction felt by the work performed.

### 3 Results

Respondents were asked to determine the level of their own involvement in the work. The analysis shows that the respondents assessed their engagement very highly ( $M_0 = 6$ ). The value of the standard deviation and the coefficient of variation for the total response indicates a small variation in the scale of assessments of the respondents' own involvement. The results are shown in Table 6.

**Table 6.** Commitment to the work of the X and Y generation.

Specification	$\bar{x}$	$M_0$	Number of $M_0$	$SD$	$V$
Total	5.21	6	52	1.079971	20.73708
Generation X	5.19	6	36	1.129092	21.72508
Generation Y	5.23	6	16	0.971431	18.56238

Asked employees from both generations assess the level of their involvement very high ( $M_0 = 6$ ). It should be noted that the value of the calculated standard deviation and the coefficient of variation in the case of the Y generation is lower than in the case of employees from the X generation. This proves the lower variability in the scale of the assessments they provide. In addition, the average commitment among those asked from the Y generation is higher than the X generation. Such a structure of responses, in particular a high assessment of the own involvement of respondents from the Y generation may indicate their high self-esteem, regardless of their level of knowledge or competence. Generation Y is usually young people who are at the beginning of their professional career. Therefore, their involvement can be high, especially when the work in a given company is their first. Table 6 presents the evaluation of job satisfaction.

**Table 7.** Satisfaction from work of the X and Y generation.

Specification	$\bar{x}$	$M_0$	Number of $M_0$	$SD$	$V$
Total	4.37	6	30	1.398939	31.96670
Generation X	4.28	6	20	1.465636	34.23031
Generation Y	4.60	6	12	1.220514	26.53292

In the case of assessing job satisfaction, average values of assessments calculated both in total and for individual generations are lower than in the assessment of the level of own involvement. Despite the fact that  $M_0 = 6$ , the high value of the coefficient variation and standard deviation indicates that the diversity of the scale of assessments is significant. The main difference is the value of the average assessment of the level of satisfaction between the representatives of Generation Y and

Generation X. Generation Y exaggerates this issue much better than Generation X. Such a structure of responses may result from the seniority of the employees concerned. Generation Y as young people are interested in new work, and thus, they try harder. In addition, the current trend, the so-called an employee's market contributes to the fact that people are more and more often employed in enterprises related to their education or interests, which additionally has a positive impact on the level of job satisfaction.

In the case of employees of the X generation, a lower assessment of their own satisfaction at work may also result from the employment period. In this case, they are people working for more than 15 years in one organization, which is why it can be understood in such a way that a given employee in a given organization has already reached its maximum development. Consequently, without having the opportunity to develop their passions or to perform specific activities without any changes for a long time, the level of job satisfaction may decrease (tab.8).

**Table 8.** The relationship between the level of self-commitment and satisfaction with the job.

	Generation X	Generation Y
Spearman correlation coefficient R	<i>0.483114 (p=0.000020)</i>	<i>0.368089 (p=0.04557)</i>

The table presents the Spearman correlation coefficient for the relationship between the engagement and satisfaction of the surveyed respondents. The significance level was assumed to be  $p < 0.05$ . The analysis shows that the relationships between the level of self-commitment and satisfaction felt by the work performed are statistically significant in both generations. The described dependence is stronger in the case of generation X than generation Y. The values of the calculated ratio indicate that between the level of self-commitment and satisfaction with the work performed are clear.

To conclude, it should be noted that the surveyed representatives of both generations evaluate highly both the level of their own involvement and the satisfaction felt by their work. In the case of respondents employed in the health care sector, this may be due to the specificity of their profession. In the case of people employed in the financial sector, a high level of involvement may be determined by the expenditure of obligations and requirements set by the employer. In the financial industry, employees are required to achieve and develop specific financial results imposed by the employing company in advance. The relationship between the level of job satisfaction and commitment to it was identified. These relationships in both studied generations are statistically significant, however, the value of the calculated coefficient is higher in the case of generation X than generation Y.

## 4 Conclusions and Recommendations

In the literature on the subject, issues related to the management of human capital are increasingly discussed. Contemporary organizations are increasingly perceiving the

role of employees in the organization. Despite noticing the importance of the employee's role in the organization, enterprises operating in Poland are struggling with rotation or lack of employees, especially in the health care system.

As a result, keeping an employee in a given organization is an increasingly difficult challenge for managers. The level of involvement in the work significantly influences not only the results achieved by a given employee, but also by the entire organization. It was also shown that there is a statistically significant relationship between the level of commitment at work and satisfaction with it.

Exerting influence on employees' involvement in the financial sector is a quite specific process. At present, there is an intense development of enterprises offering financial services for individual clients, who more often reach for cash or mortgage loans. The development of this industry entails the need to employ sales specialists who, with appropriate motivation, can significantly influence the growth of the company's results. In order for a person employed in the financial industry to be distinguished by high commitment, it is first of all necessary to identify the employee with the company's mission and vision, and to maintain the conviction that the services offered will solve the problems of the clients, but not make them even more.

In the group of medical professions, the level of employee involvement may result from personal values that employees profess. Certainly, it translates into both the quality of the services offered and the assessment of the staff by the patient. People who learn in the medical profession often have a desire to help others. However, paying attention to the level of remuneration in the medical sector and the increasingly observed staff shortages, the management of hospitals and other medical facilities should undertake activities aimed at increasing the level of both job satisfaction and employee involvement. Hospital managers should primarily invest in young workers and the latest medical equipment. Such improvement of working conditions will certainly have a positive impact on increasing the level of engagement and job satisfaction.

The research results presented in this article clearly show the existence of a relationship between the level of own involvement in work and the satisfaction felt by it both among employees of the X and Y generation. The surveyed respondents highly evaluate the studied relationships. Certainly, this is related to their personal feeling of the importance of their position and the duties they perform. It should be noted however that there is a need for further research related to the involvement of employees as well as the satisfaction felt by the work. These studies should take into account not only the assessment of employees, but also the opinion of their managers.

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## **Subsidies from the Common Agricultural Policy of the EU versus Agricultural Incomes in the European Union Countries in 2005-2015**

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**Abstract.** The purpose of the article was to determine whether there were significant differences in the size of agricultural incomes in farms belonging to the same economic classes between agricultural holdings in the EU-15 and EU-12 countries. The first part of the study discusses the peculiarities of the agricultural sector, especially the need to affect the amount of income earned by this sector. Then the instruments of the Common Agricultural Policy of the EU supporting the value of income in agricultural holdings were pointed out. In the next part of the study we compared the characteristics of average agricultural incomes per farm in EU countries after considering the value of subsidies from the CAP and without them in the years 2005-2015. The last part of the study presents the values of agricultural income per farm including subsidies from the CAP in the EU-12 and EU-15 countries in individual years of the period 2005-2015. For this purpose, EUFADN farm accountancy data were used. It has been shown that CAP subsidies contribute significantly to reducing the income deprivation of EU agriculture. The scale of this impact varies, however, depending on the country. It was also proved that farms with a standard output of up to EUR 25,000 from the EU-15 countries showed higher average income in 2005-2015 than from EU-12 countries. In larger farms in terms of turnover (EUR 25,000 and more) it was the opposite.

**Keywords:** Agriculture, EU, CAP UE, Agricultural Income.

### **1 Income Deprivation of the Agricultural Sector and Determinants of Supporting its Economic Situation**

The basis for differences between agriculture and other branches of the national economy is the specific nature of agricultural production, closely related to the land factor. Czyżewski and Matuszczak [2] indicate that the essence of the problem lies in the fact that land is a non-competitive production factor in relation to the other two - labor and capital. Farmers who, in the conditions of coercion of food consumption, farm land to satisfy the food needs of others, are doomed to permanent disparity of income, resulting primarily from the lack of mobility and specific features of this factor, such



as incoherence, potential indecency or limited productivity. Agriculture, therefore, has specific characteristics that give it a certain degree of universal and lasting character. Regardless of the system and the level of economic development of the country, agriculture is considered a weaker partner as a branch of the national economy, which results from the imperfect ability to accumulate and conduct expanded production [3]. The natural impairment of reproduction processes in agriculture, resulting from the aforementioned lack of land mobility, manifests itself primarily in the inefficient allocation of production factors by the Pareto criterion [2]. The reasons for this are, *inter alia*, their seasonality, dispersion, scale of risk and uncertainty resulting from atmospheric conditions, variable intensity and pace of work, occurrence of production cycles, King and Giffen effects and the combined presence of producer and consumer functions [2]. This has a destabilizing effect both on agricultural income and on the profitability of agricultural turnover. The need to support agricultural income stems from the immovable income depreciation of agriculture, as well as the security of food security. The necessity of influencing the income situation of agriculture in the EU also stems from the strategic goal of this group, which is sustainable development. In 1997, sustainable development became a major challenge for the EU and was included in the Amsterdam Treaty as the overarching objective of EU policy [6]. This concept is focused on economic growth, solving social and environmental problems. The Amsterdam Treaty underlines that the long-term development of the European Union will only be possible with the joint participation of three factors: economic growth, social cohesion and environmental protection [6]. Defining sustainable agriculture, just like the concept of sustainable development, takes place through the prism of three basic orders: environmental, economic and social, with revenues being a priority when determining the level of sustainable development of agriculture in the economic dimension. A special set of indicators of socio-economic sustainability has been developed for the assessment of the functioning of agricultural holdings. The criterion of economic evaluation are usually production results (e.g. the amount of revenues, income and production costs) and the profitability, liquidity, stability and productivity indicators based on them [9]. The additional criterion of "autonomy" is proposed by Bossel [1]. This autonomy (freedom) can be seen as becoming independent from the purchase of external inputs, which means that farms are less susceptible to any fluctuations in the prices of the production factors. Autonomy can also be assessed in terms of the degree of indebtedness or the impact of subsidies on the economic outturn. Finally, autonomy may be associated with the possibility of income diversification - the higher it is, the more autonomy, while income can be diversified by this obtained from agricultural production or non-agricultural income. The economic dimension can also be equated with the concept of farm viability, i.e. the ability to stay in the long run in changing market conditions [10]. In connection with the above arguments, it is justified to support the economic situation of agriculture because it affects the reduction of deprivation of this sector and also promotes its sustainable development, especially in the economic dimension. These objectives also conceal the common agricultural policy of the EU.

## **2 Common Agricultural Policy in Shaping Agricultural Incomes**

There are two sub-periods in the functioning of the common EU agricultural policy. The first (since its inception to Mac Sharry's reform) was a time of supply policy aimed at ensuring the EU's food self-sufficiency. The second, formally initiated in 1992, is the time of policy for demand. As Poczta et al. [7] say all subsequent reforms and changes in the CAP, introduced after 1992 were a continuation of the ideas contained in the assumptions of the Mac Sharry reform [7]. Regardless of the period of operation, the instruments of the common agricultural policy influenced the size of agricultural income in the European Union, limiting the income deprivation of this sector to others. Since the inception of this policy to the reform in 1992, such role was played, for example, by minimum price levels, compensatory payments, direct payments for production, as well as lump sum aid per hectare or animal unit, for more details see Czyżewski A., Matuszczak [2], Judzińska, Łopaciuk [5]. In the final analysis, by affecting the supply of agricultural products, the instruments influenced agricultural income. Since the Mac Sharry reform, new CAP instruments have been introduced. These instruments include direct payments, agri-environmental payments and support for less-favored areas. For more details see: Stępień, Guth, Smędzik-Ambroży [10]. This caused a change in the CAP slope towards the impact on agricultural incomes, however, without the dependence of these revenues on the volume of agricultural production. This at the same time resulted in the reduction of the adverse impact of agricultural production on the natural environment. It has been noticed that intensive agriculture, to which the primary shape of the CAP contributed significantly, results in negative externalities, such as biodiversity loss, contamination of naturally valuable areas of agricultural production, etc. Moreover, it was noticed that the disproportion in European agriculture was deeper, especially in development and resource-production structures between and within regions, which was caused by the concentration of retained income in the strongest and largest farms. In addition, it intensified social and environmental diversification [4].

This was an impulse to start the process of reforming the CAP towards sustainable development. At the same time, it should be added that the intensive farming model has not solved the problem of agricultural income, despite the over-exploitation of natural resources. Therefore, it did not meet the criteria of microeconomic efficiency and was not rational in the context of general social requirements. Therefore, its reform towards greater sustainability was necessary and justified, also in the aspect of the EU's strategic objectives. In connection with the above, it can be concluded that countries with a longer membership in the EU were subject to a greater extent of the influence of institutional conditions aimed at increasing the profitability of European agriculture. Therefore, the question is whether, after considering the support for income from the common agricultural policy between the EU-15 and EU-12 countries, there were significant differences in the value of agricultural income in farms belonging to the same economic classes.

### **3 Research Methodology**

In the analyze, the accounting data of representative farms belonging to the unified agricultural farm accounting data network (FADN) was used. In the first stage of study, a comparison was made between the average income per farm in 2005-2015 in EU countries with subsidies from the CAP and without them. The purpose of this analysis was to determine the impact of CAP subsidies on agricultural incomes in EU countries. In the next stage of study, the values of income per farm, including subsidies from the CAP, were presented in groups of farms belonging to the same economic classes, applying the division into EU-12 and EU-15 countries, in individual years of the period 2005-2015. These classes are expressed in turnover values expressed in EUR. The subsidies from the CAP included:

- single area payments (SAPS),
- the sum of set-aside and agri-environment payments,
- support for less-favored areas,
- other subsidies under rural support programs,
- payments for crop and animal production (sum of other subsidies for crop and animal production, balance of subsidies and penalties for milk producers, subsidies to other cattle and subsidies to sheep and goats),
- investment subsidies.

The analyzes did not take into account the year 2004, because in the accession countries in May 2004 agricultural subsidies covered only a period of several months and thus the income from agriculture in these countries could be understated compared to the following years. Malta and Cyprus were excluded from the analyzes due to outstanding observations of agricultural income from farms from these countries. Consequently, the impact of the CAP on the value of farm incomes in the EU, divided into EU-15 countries (Belgium, Denmark, Germany, Ireland, Greece, Spain, France, Italy, Luxembourg, Netherlands, Austria, Portugal, Finland, Sweden, United Kingdom) and EU-12 countries (Czech Republic, Estonia, Latvia, Lithuania, Hungary, Poland, Slovenia, Slovakia) was summarized.

### **4 Agricultural Income in the EU in the Years 2005-2015 with Division to EU-15 and EU-12 Countries**

The average farm income in the EU-15 countries in the years 2005-2015 without subsidies from the CAP amounted to EUR 1710 and was definitely higher than in the analyzed EU-12 countries, where agricultural production costs were higher than revenues. In the EU-12 countries, the average loss in the years 2005-2015 was as high as EUR 27,779 per farm. In both groups subsidies to agriculture from the CAP significantly increased the profitability of agricultural production. In the EU-15 countries, they increased the incomes per farm by as much as 679%. Thanks to the support from the CAP, the average agricultural income in the EU-15 countries in the

analyzed period amounted to as much as 28707 EUR per farm. In the EU-12 countries, this increase was even higher, as the average agricultural income in 2005-2015, after considering the value of subsidies from the CAP, amounted to as much as 10860 EUR. In particular, this was caused by CAP support of agricultural income in countries such as Czech Republic, Estonia, Latvia, Hungary, Slovenia and Slovakia. Without subsidies from the EU agricultural policy farmers from these EU-12 countries achieved, on average over the period considered, losses. Only farmers from Poland and Lithuania from EU-12 countries achieved a positive average income per farm in 2005-2015 (see Table 1).

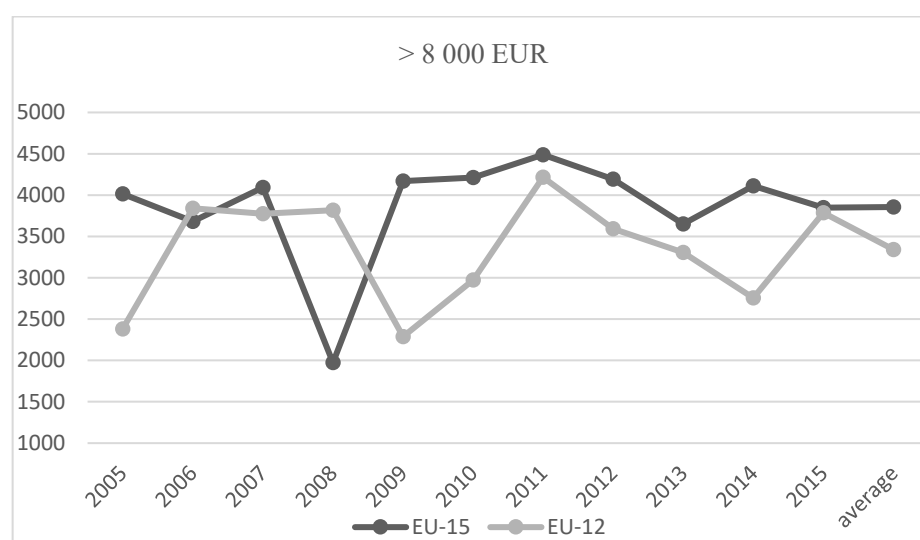
**Table 1.** Average farm net income in EU countries in the years 2005-2015 in EUR.

EU country	Average farm net income in EUR	
	Without CAP subsidies	With CAP subsidies
Belgium	27905.55	53285.45
Czech Republic	-42041.8	34629.55
Denmark	-23602.3	12252.36
Germany	1976.455	36607.55
Estonia	-7792.55	16537.00
Ireland	399.1818	20999.18
Greece	6141	12909.91
Spain	14053	23522.64
France	4781.455	36377.64
Italy	17872.64	24638.00
Latvia	-3357.91	11653.64
Lithuania	2633.636	12961.36
Luxembourg	-15592.7	43317.73
Hungary	-728.636	14503.91
Netherlands	30714.55	49195.45
Austria	5513.273	25618.27
Poland	3542.091	8769.273
Portugal	4886.545	12174.45
Slovenia	-148949	5566.182
Slovakia	-25536.8	-17742.5
Finland	-29132.7	20204.36

Sweden	-21785.4	14983.55
United Kingdom	1518.455	44518.00

In the U-15 countries, losses from agricultural production per farm without subsidies from the CAP, in 2005-2015 were achieved by farmers from the Scandinavian countries, namely Denmark, Finland and Sweden as well as from Luxembourg (see Table 1). The lowest percentage increase in income from agricultural production per farm thanks to subsidies from the CAP, in the examined period occurred in the EU-15 countries, such as Italy (by 38%), the Netherlands (by 60%), Spain (by 67%), Belgium (by 91%), Greece (by 110%). In the EU-12 countries, except for countries recording surpluses of costs over agricultural production revenues, the increase in income from agricultural production after including subsidies amounted to 392% in Lithuania and 148% in Poland. Therefore, it should be said that subsidies from the CAP had a positive impact on the income situation of European agriculture, despite the fact that the scale of this impact varied in individual EU countries. The support from the CAP significantly limited the deprivation of the agricultural sector in the EU in relation to other sectors of the national economies.

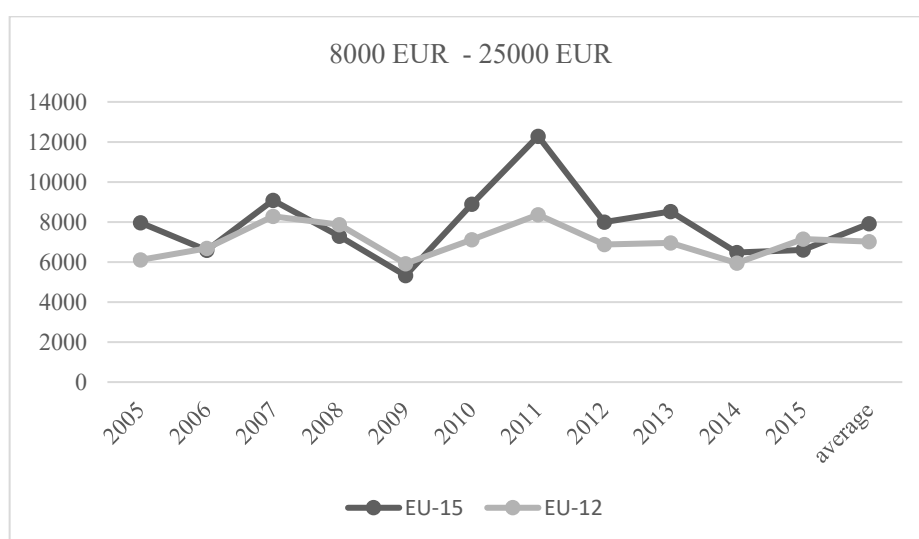
In the next step, the value of agricultural income per farm was analyzed, including subsidies from the CAP in the EU-12 and EU-15 countries studied, in particular years 2005-2015 in farms of identical economic classes.



**Fig. 1.** Agricultural income per farm with a turnover of less than EUR 8,000 in the EU-15 and EU-12 countries, in the years 2005-2015 in EUR.

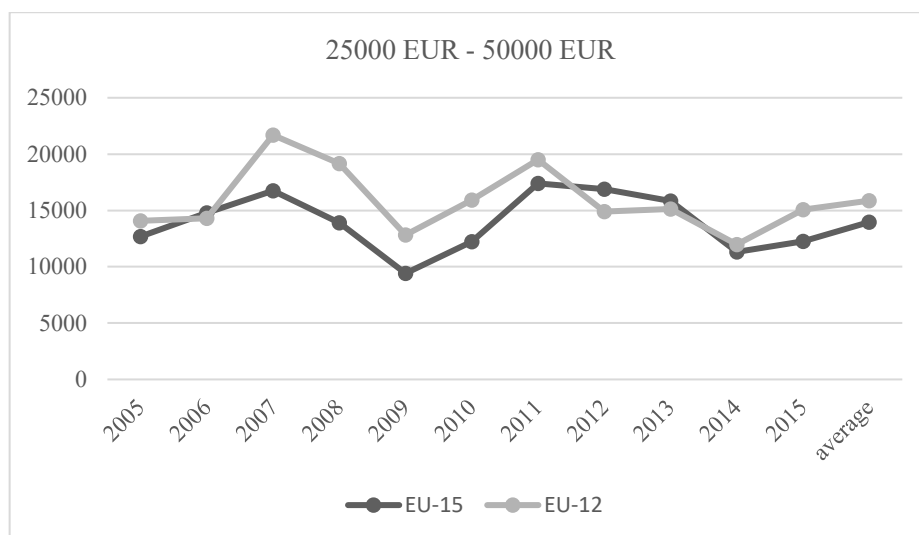
The lowest economic class of representative FADN farms (up to 8,000 EUR) occurred only in the EU-15 countries, such as Greece, Portugal and Slovenia, whereas in EU-12 it was in: Latvia, Lithuania, Hungary, Poland. However, in the years 2005-2015, farms

of this class, taking into account the value of subsidies from the CAP, from EU-15 countries showed only slightly higher average incomes in 2005-2015 than from EU-12 countries (by 16%). Characteristic was the year 2008, when the income of this class of farms was higher in the EU-12 countries than the EU-15 (as much as 93%) (see Fig. 1). Also in the next economic size class, agricultural farms from the EU-15 showed slightly higher incomes in 2005-2015 than farms from EU-12 countries. The difference was only 13% in the entire analyzed period of time in favor of the analyzed EU-15 countries. The much higher agricultural incomes in the EU-15 than the EU-12 can only be observed in 2011 (see Fig. 2).

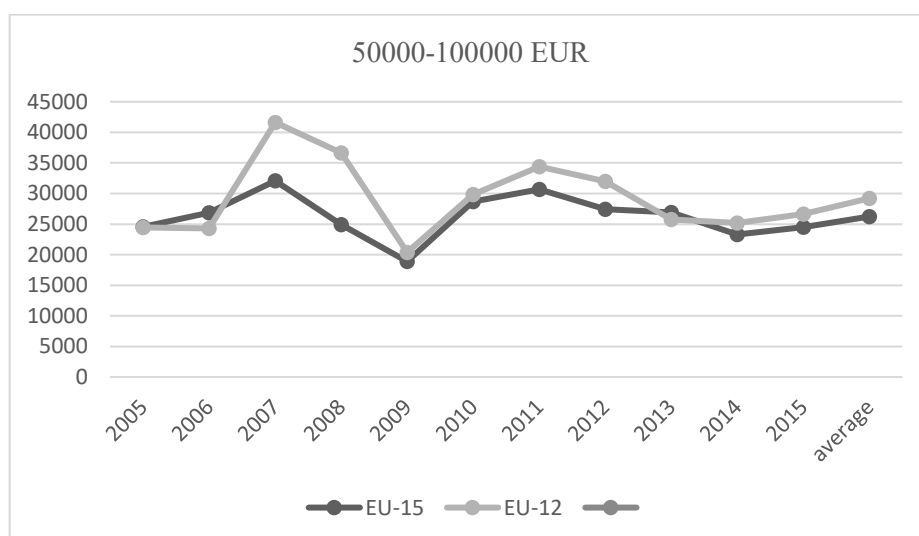


**Fig. 2.** Agricultural income per farm with a turnover of EUR 8,000 to EUR 25,000 in the EU-15 and EU-12 countries, in the years 2005-2015 in EUR.

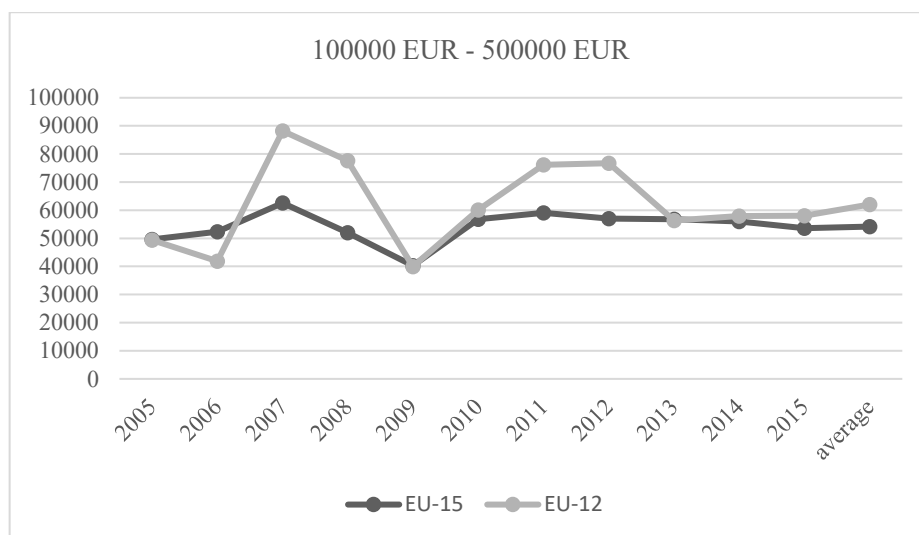
In subsequent economic sizes of farms by their turnover, this tendency was reversed, ie farms from EU-12 in average between 2005 and 2015 achieved higher income values than EU-15 countries (see Figures 3 to 6). These differences were 14%, 11%, 15% and 19% respectively in favor of EU-12 farms in relation to EU-15.



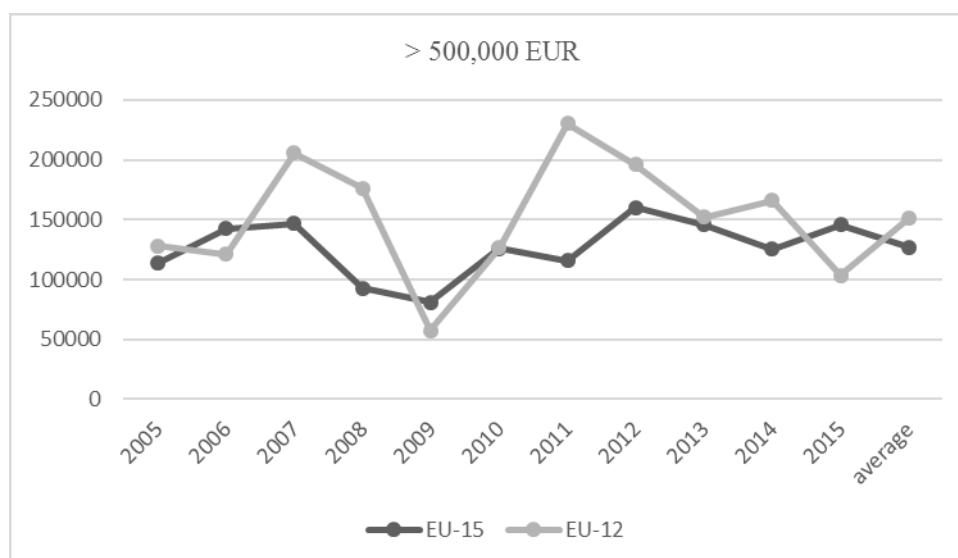
**Fig. 3.** Agricultural income per farm with a turnover of EUR 25,000 to EUR 50,000 in the EU-15 and EU-12 countries, in the years 2005-2015 in EUR.



**Fig. 4.** Agricultural income per farm with a turnover of EUR 50,000 to EUR 100,000 in the EU-15 and EU-12 countries, in the years 2005-2015 in EUR.



**Fig. 5.** Agricultural income per farm with a turnover of EUR 100,000 to EUR 500,000 in the EU-15 and EU-12 countries, in the years 2005-2015 in EUR.



**Fig. 6.** Agricultural income per farm with a turnover of more than EUR 500,000 in the EU-15 and EU-12 countries, in the years 2005-2015 in EUR.

These differences were particularly evident in farms belonging to economic size classes from EUR 100,000 to EUR 500,000 and above EUR 500,000 (see Figures 5 and 6). At this point it is worth adding, that in these classes by far the highest and deviating from



others in the EU-12 were farms from Latvia and Hungary. In other economy classes, these were farms from Lithuania, Estonia, Hungary, and also in farms with turnover from EUR 25,000 to EUR 50,000 – these from Czech Republic.

## 5 Conclusions

The agricultural sector, due to its peculiarities, i.e. seasonality, immobility of the land factor, Giffen paradox, or King's effect, is characterized by lower incomes than other sectors of the national economy. Due to the strategic nature of this sector, as well as the paradigm of sustainable development, its income deprivation should, however, be limited. This function is performed in the EU by subsidies from the common agricultural policy, which support agricultural income. Studies have shown that irrespective of the length of a given country's membership in the EU, CAP subsidies constitute an important factor supporting agricultural income. It is surprising that farmers with a turnover of over EUR 25,000 from the EU-12 achieved even higher average incomes per farm in the years 2005-2015 than from the EU-15 countries. In the lower classes, the economic multiplicity of farms was the opposite. Regardless of the country, it should be stated that EU farmers thanks to the common agricultural policy achieve a political rent. This is evidenced by the income effects of this policy. As a result, it plays a significant role in the sustainable development of this sector. It should also be added that agricultural policy in the EU is also a substitute for microeconomic efficiency relations, contributing to limiting the pressure of agricultural production on the natural environment.

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## **Innovativeness of Young Farmers Based on Farms in the Wielkopolskie Province**

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**Abstract.** Introduction of innovations on farms is a crucial issue, it is a measure of progress, it provides a competitive advantage and makes it possible to increase revenue from agricultural production. The primary aim of this study was to identify innovative activity of young farmers, as well as their attitude to changes implemented on farms. The nonprobability sampling of the population was used and opinions of farmers were collected using the questionnaire survey method. Among the farmer respondents the predominant groups comprised individuals in favour of changes, expecting verified innovations and relying on the opinions of others. Young farmers indicated the Internet as well as television and the radio as the primary sources used when searching for new solutions. Innovations were introduced most frequently in plant production.

**Keywords:** Innovations, Young Farmers, Farms, Information Sources.

### **1 Introduction**

Innovations on farms are necessary when facing the contemporary market requirements. Innovativeness may significantly affect improvement in productivity and increase competitiveness of the agricultural sector, as well as promote improved quality of agricultural products. Implementation of new technological and biological solutions or innovative ideas provides a chance to increase efficiency and reduce production costs while increasing revenue from agricultural production.

Literature on the subject presents numerous definitions and concepts of innovations. In 1912 a definition of innovations in relation to economy was formulated for the first time by Schumpeter, who saw it as "a change in the function of production of considerable scope", consisting in the "combination, i.e. association of means of production" differing from that used previously, thus disturbing the current state of equilibrium [18]. He added further nuance to the concept of innovation - defined as any addition to the existing body of technical knowledge or know-how that results in an outward shift of the production function and a downward shift of the associated cost curves - by distinguishing between product, process, and organizational innovation [2, 17]. In turn, Drucker [3] defined innovations as "a change in the product design, marketing method, offered price, service provided to the customer or a change in the organisation and in management methods, which affects all spheres of enterprise

activity". In the opinion of Rogers [15] and Kotler [8] an innovation is any good perceived as a novelty by others. According to Niedzielski et al. [13], an innovation is "a purposeful and organised activity of entrepreneurs searching for practical applications for various new solutions under specific conditions and in a given time period in order to obtain positive economic results, to more effectively satisfy consumer needs and more efficiently utilise available resources". According to the Oslo Manual 2005, "innovations consist in launching of a new or significantly improved product, or application of a new (or modernised) technological process" [10]. Innovation has been identified as one of „the five key drivers of productivity“, so it is one of the key determinants of the relative economic performance of rural areas [1].

Innovations in agriculture are defined as new products or production measures, or ideas aiming at an elevation of prestige or those which entice team activity [11]. In turn, Ryznar defined innovations in agriculture as any new idea or concept aiming at rationalisation of production processes, measures adopted on the farm or in the household, as well as any equipment facilitating work or increasing its efficiency, and any product of human activity, model or pattern to follow, or values previously not found on a given farm or in a specific village [16]. Other researchers in their investigations stress the role of consumers in the initiation and implementation of novelties, defining innovations in agriculture based on purposeful changes introduced by farmers to replace current methods of production or products with new, more efficient and useful under specific conditions [9, 11].

In the innovation diffusion process the attitude of individuals managing farms towards changes and novelty is important. The term diffusion of innovation means the process of disseminating a new solution in subsequent implementations. In his studies on diffusion of innovation Rogers [15] showed that the potential attitude of users is a source of success in the implementation of innovations. He distinguished five categories of individuals depending on how fast they introduce changes or implement innovations, i.e. innovators, early adopters, early majority, late majority and laggards. "Pioneers" are daring individuals, risk-takers, by nature interested in new things, but at the same time they get disinterested very fast. Early adopters are pioneers in a given field, being opinion leaders. They consciously take a risk to implement innovations, at the same time expecting greater risks generated by the early adoption of a certain novelty. Members of the group defined as "early majority" are users representing the mass market, they expect verified innovations, they greatly rely on references from other individuals who have already adopted the novelty. They are rather reluctant to accept changes or follow new trends. The "late majority" are skeptical, finding no real advantage in the new solution, with the pressure from the surroundings being the reason to adopt the innovation. The last group comprises "laggers", characterised by their aversion to innovations and for whom it is difficult to overcome their objections.

Thus innovation is a very broad term and refers to all spheres of social, economic and cultural life. This problem is particularly crucial in agriculture, as it has to take into account unique characteristics of this sector. It is connected primarily with modernisation, implementation of changes and improvements within the entire farm, popularisation of novel organisational solutions, enhanced efficiency and productivity,

as well as introduction of new cultivars, application of new pesticides and fertilisers [7, 14, 20].

The aim of this study was to identify innovative activity of young farmers, as well as their attitudes to changes implemented on farms. In this study it was decided to define innovation as any change introduced on farms, which do not necessarily have to be novelties, but rather those introduced for the first time.

## **2 Material and Methods**

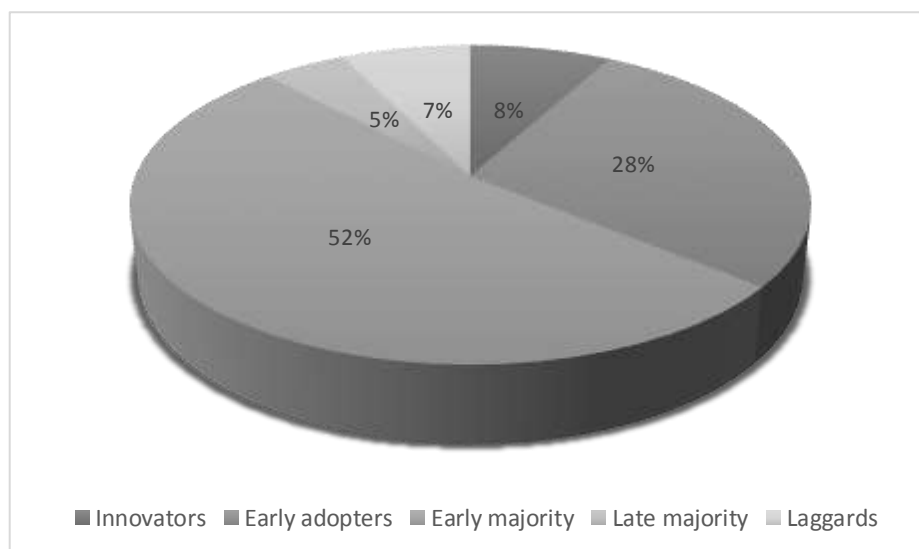
In order to realise the proposed aim it was decided to use results of empirical studies conducted from September 2017 to April 2018 on a population of 150 selected farms in the Wielkopolskie province. The study population was based on nonprobability sampling, considering commercial farms providing the primary source of income for the farming family, managed by young farmers, i.e. individuals aged below 40 years. The measurement method was direct interview using a standardised questionnaire. The questionnaire was prepared using closed questions. Questions were also asked using the Likert scale. Collected information was analysed and next described using descriptive statistics methods.

## **3 Results**

The survey involved 43 women and 107 men, with 69 individuals having university education (46%), 42 secondary school education (28%), while 39 respondents had vocational school education (26%). The average size of analysed farms was 9.6 ha agriculturally utilised area.

In the innovation diffusion process the attitude of individuals managing farms towards changes and novelty is crucial. In his studies on diffusion of innovation Rogers (1962) showed that the potential attitude of users is a source of success in the implementation of innovations. He distinguished five categories of individuals depending on how fast they introduce changes or implement innovations, i.e. innovators, early adopters, early majority, late majority and laggards. "Pioneers" are daring individuals, risk-takers, by nature interested in new things, but at the same time they get disinterested very fast. Early adopters are pioneers in a given field, being opinion leaders. They consciously take a risk to implement innovations, at the same time expecting greater risks generated by the early adoption of a certain novelty. Members of the group defined as "early majority" are users representing the mass market, they expect verified innovations, they greatly rely on references from other individuals who have already adopted the novelty. They are rather reluctant to accept changes or follow new trends. The "late majority" are skeptical, finding no real advantage in the new solution, with the pressure from the surroundings being the reason to adopt the innovation. The last group comprises "laggers", characterised by their aversion to innovations and for whom it is difficult to overcome their objections.

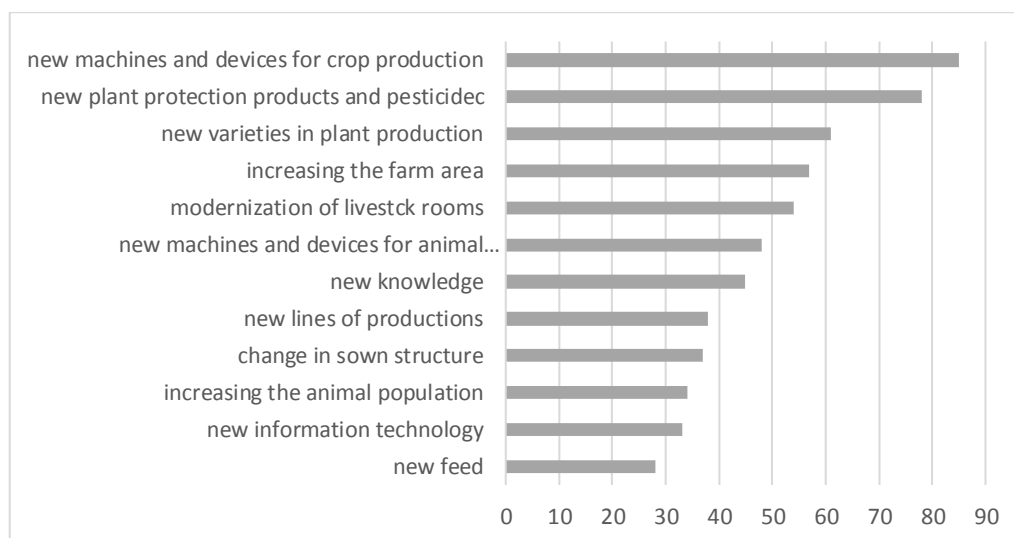
Farmers were asked of their attitude to the introduction of changes and novelties on the farm and the questionnaire distinguished five types of attitudes to innovations following the Rogers classification (Fig. 1).



**Fig. 1.** Farmers' attitudes to the introduction of changes and novelties.

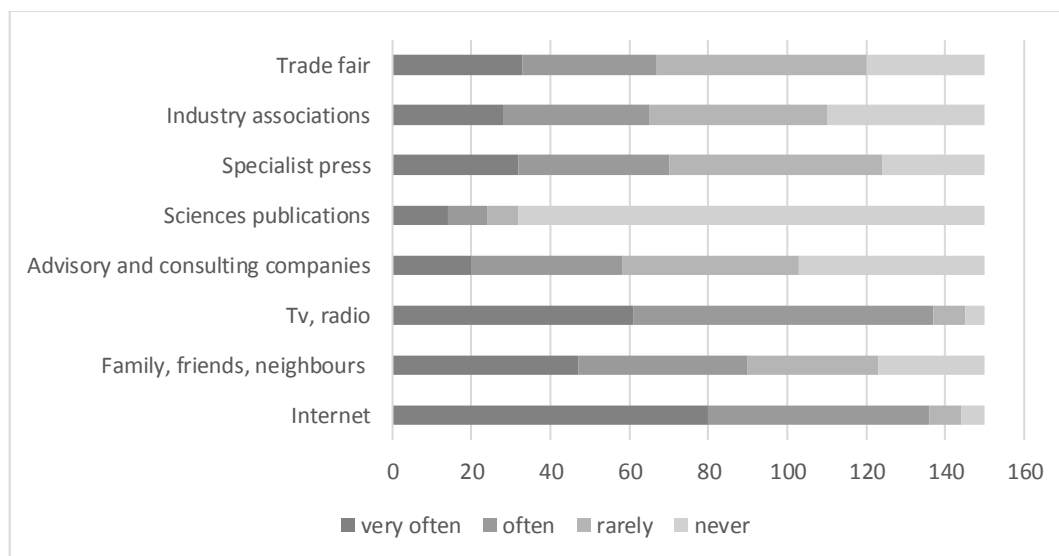
Based on the conducted studies it may be stated that the dominant group among farmers (52%) may be classified as "early majority". These individuals expect verified innovations and they rely on the opinions of others, who have already adopted the novelties. The second large group (28%) comprised individuals which may be termed "early adopters", i.e. individuals who take the risk of introducing innovations, while at the same time expecting greater profits from their early implementation of the novelty. Only 8% respondents considered themselves to be "innovators", i.e. individuals willing to introduce novelties. The smallest group (7%) comprised people who introduce novelties only after they are used by more than half of all users and they are characterised by aversion to innovations [cf. 6].

As shown in the study (Fig. 2), the largest number of innovations was introduced in plant production, i.e. application of new, more efficient machines (85 declarations), fertilisers, pesticides (78) as well as new crop species and cultivars (61). Farmers declared that they are trying to systematically buy new pesticides and fertilisers or introduce new cultivars more resistant to disease, since good yields depend on that. Respondents also invest in the purchase of new machines and equipment for plant production [cf. 3]. Respondents indicated that these changes were possible thanks to EU direct payments, which provides a substantial financial aid to the investigated farms. In the case of animal production the most frequently introduced innovations included modernisation of animal housing facilities (54 respondents) and purchase of new machines and equipment (48). Innovations in terms of farm economics and organisation were related first of all with increased area of farms (57), as well as knowledge (45), e.g. concerning acquisition of EU funds.



**Fig. 2.** The number and types of innovations implemented on farms.

Implementation of new solutions requires knowledge on issues related to many fields and search for new solutions. An objective in this study was also to identify the sources of information on novelties in agriculture most frequently used by respondents (Fig. 3).



**Fig. 3.** Sources of information on innovations in the opinion of farmer respondents.

Very often farmers, while looking for information on innovations outside their farms, themselves initiate such changes. Young farmers often consider the Internet and mass

media (TV, radio) to be the best and most important sources of information on new solutions in agriculture. The obtained results confirm the results obtained in the research conducted by Harasim et al. [5] Kalinowski, Prymon [6], Kielbasa, Puchała [7] and Oreszczyn [19]. The respondents indicated the family, friends and neighbours as those supplying information on innovations to rank as second in importance. In contrast, respondents declared least interest in extension services provided by consulting companies and agencies, professional fairs and scientific publications.

## 4 Conclusion

Young farmers understand the necessity to introduce changes; however, they show caution and act with deliberation when adopting novelties. When making decisions they consider the references of individuals who have already adopted the novelty as well as analyse pros and cons of implementation of a given innovation. Farm owners most frequently used information on novelties in agriculture from the Internet, mass media (television, radio, press), as well as the family, friends and neighbours. In terms of the structure of introduced innovations the largest number were innovations in plant production, i.e. new cultivars, application of certified seeds, new pesticides as well as new machines and equipment.

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## **Applied Agrarian Import Ban and its Impact on Mutual Trade among Russian Federation and European Union & other Selected Countries**

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**Abstract.** Paper's goal is to provide an overview of Russian import ban impact on trade between Russian Federation and USA, Canada, Australia, Norway and especially EU countries. The paper identifies the changes affecting especially EU agrarian exports performance in relation to Russian Federation. There're changes identified in trade in vegetables, fruits, meat and animal products, dairy and dairy products and fish. There're following findings in the paper: The result of the applied import ban was a significant reduction of Russian agrarian import value (within the first three years alone, the value of imports was reduced by 7,389 million USD). Applied ban affected especially those imports which could be understand as competitors for national production capacities. The potential to substitute those items by local production is evident. The applied ban affected imports especially from Lithuania, Germany, the Netherlands, Denmark, Spain, Belgium, Finland and France. Speaking about the most affected countries, in relation to the share of Russian imports in their trade performance, the most affected countries are Lithuania, Latvia, Estonia, Finland and Poland. To satisfy domestic demand Russia increased food imports especially from Serbia, China, Azerbaijan, Ecuador, Kyrgyzstan, India, Macedonia, Georgia, Bosnia and Malaysia. The negative feature of applied ban especially for Russian consumers was the reduction of food heterogeneity, the growth of food price, the reduction of competitiveness and available food quality reduction.

**Keywords:** Russian Federation, Agrarian Import Ban, European Union.

### **1 Introduction**

Russian food import ban must be understood not only as political answer for Western countries applied sanctions and criticism, but it is also the result of long-run Russian food security and food independency policy [9]. While in period 1991 - 2005 the volume and value of national food production were decreasing, the value and volume of imports were constantly increasing. The result of such development was constantly increasing negative agri-food trade balance [12]. In transformation period especially, export commodity structure became more concentrated into only few especially bulk commodities. Import profile became very heterogeneous and because of low import

prices it represented the significant barrier for Russian agricultural sector recovery [7]. Already in period before the import ban was applied Russian government was seeking for the arguments to protect its market and the increase national food security [2]. Western countries sanctions provided arguments for Russian government to apply its plans supporting expansion of domestic agricultural sector. The applied import ban supported the original Russian government's Doctrine of Food Security of RF [13]: grain – 95% self-sufficiency, sugar – 80% self-sufficiency, vegetable oil – 80% self-sufficiency, meat and meat products – 85% self-sufficiency, milk and dairy products – 90% self-sufficiency, fish products – 80% self-sufficiency, potatoes – 95% self-sufficiency, edible salt – 85% self-sufficiency). Applied ban affected import of vegetables, fruits, animal and dairy products and fish products. The Russian agrarian import ban has been extended and changed several times since 2014.

The impact evaluation of the Russian embargo from the Russian and foreign point of view has been considered in recent studies. A regression-based analysis revealed that sustainability of the food supply in Russia is threatened by inflation and a degrading purchasing power of the population from people shifting towards cheaper products of lower quality, while exporters seek higher profits outside the country and thus create food shortages in the domestic market [3]. The most promising new strategy to overcome the prospective crisis could be an increase of food products to Asian and African countries [10].

To cover the food shortage, Russia started or expanded collaboration with other partners of the world, e.g. Brazil, Belorussia, Paraguay, Argentina and Iran (meat), Ecuador, Pakistan, Morocco, China (fruit), Egypt, Republic of South Africa, Israel, Azerbaijan (vegetables) etc. [8].

The goal of this paper is to provide an overview of Russian import ban impact on trade between Russian Federation and affected countries. Because of applied ban character, the European Union could be considered as the most affected subject of Russian protectionism. The paper identifies the changes affecting especially EU agrarian exports performance in relation to Russian Federation. Changes in trade in vegetables, fruits, meat and animal products, dairy and dairy products and fish are identified. Paper also deals with changes in Russian trade competitiveness and territorial structure.

## **2 Data and Methods**

This paper is focused to provide an overview of applied Russian import ban impact on the first set of countries (Australia, Canada, European Union, Norway, United States of America). Those countries' agricultural trade is affected by Russian import ban for last five years (2014-2018) and it is expected that import ban will be in force until at least 2019. During the last few years the list of countries and items under the ban increased. Because of data availability, this paper has been analysing the impact of applied ban on original countries and changes in their agricultural trade performance and Russian territorial structure are analysed for the period 2014-2016.

The basic sources of data for the analysis are Federal Customs Service of Russia [5], Federal State Statistics Service of RF [6], UN Comtrade [1] and FAO UN [4]. Data involved into the analyses is organized according to Harmonized Commodity Description and Coding System (HS) of the World Customs Organisation.

The paper is analysing changes in commodity structure value and volume development. Separately are analysed items affected by applied ban and trade in items not affected by import ban. The most affected commodity aggregations are the following: meat and meat products, milk and dairy products, vegetable and fruit and fish.

The processed data are analysed through the set of the following instruments (for the possibility to compare the real impact of import ban – the same methodology is for the paper [11] is applied):

**Self-sufficiency ratio (SSR).** The level of self-reliance for certain types of agricultural products is determined by the percentage of agricultural production, to the consumption of the country.

$$SSR = \frac{\text{Production}}{\text{Amounts of Domestic Supply}} \quad (1)$$

**Import dependency ratio (IDR).** In the course of analysis of the food situation of a country, an important aspect is to know how much of the available domestic food supply has been imported, and how much comes from the country's own production.

$$IDR = \frac{\text{Imports}}{\text{Amounts of Domestic Supply}} \quad (2)$$

### 3 Results and Discussion

Agriculture represents the significant pillar for Russian rural areas development. Nearly 25% of population are living in rural areas, nearly 7% of economically active population are working in agriculture. Agricultural population is representing about 10-15% in total population. Agriculture is also extremely important for development of local infrastructure and some other externalities.

Russian federation has been suffering the significant import dependency especially in the case of vegetables, fruits, meat and dairy products and fish and crustaceans. The applied import ban is not random one. Ban is applied exactly in relation to those commodity items representing the weakness of Russian agriculture and foodstuff market. The potential to increase production capacity and performance is significant. The only problem to increase self-sufficiency and production performance is competitiveness and limited cost efficiency. The applied ban provides the possibility to develop local production capacities and performance. There are two by side affects related to applied ban. The first effect is political one increasing independency and the support of national production capacities. The second one is related to economic issues – reduction of consumer surplus, increasing food price and reduction of agrarian trade

deficit. Russian government is interested to change the existing disbalance between agrarian imports (12.5% of total imports) and exports (5% of total exports) in relation to total merchandise trade performance.

The idea of the following analysis is to identify the impact/efficiency of applied ban on Russian agrarian trade in relation to countries affected by applied ban.

In 2016, the total value of Russian food imports decreased by 42% in relation to 2013. The value of imports of products under the ban reduced during the analysed period by 57%.

Already the first year of applied ban affected significantly mutual trade between Russian Federation and banned countries. If we compare Russian import value of banned products in 2013 (9,007 million USD) and the value performance one year later (2014), it is possible to see the significant reduction by 3,888 million USD (but ban was applied only for last five months). One year later (2015), the applied ban already reduced imports of banned products by another 4,247 million USD (in comparison to previous year). In 2016, imports of banned products from affected countries reached only 742 million USD. It means that applied ban reduced mutual trade between Russia on one side and EU, Australia, Canada, Norway, USA on the opposite side by nearly 92%.

As a consequence of the sanctions being applied, the share of the banned countries' food products as a proportion of the total Russian food imports steadily declined. In the period 2014-2016 alone, their share reduced from cc 44% to cc 25%. The most affected subject of applied sanctions is the European Union. In the period before the sanctions, the share of the EU in Russian imports of subsequently banned food products was nearly 15%, while in 2016 it was only 2.73% (exports to Russia reduced by 5.8 billion USD). Sanctions also affected Norway (exports to Russia reduced by 1.1 billion USD).

The value of meat exports reduced from 2.282 billion USD to 536 million USD, the value of fish exports reduced from 1.55 billion USD to 64 million USD, the value of milk and milk product exports reduced from 1.78 billion USD to 4.3 million USD, the value of vegetable exports reduced from 946 million USD to 59 million USD, the value of fruit exports reduced from 1.76 billion USD to 70 million USD, and the value of food preparations exported reduced from 679 million USD to 487 million USD. The countries of the European Union can be considered as the main loser of the applied Russian import ban policy.

As a result of the import ban, the share of selected countries in Russian agrarian imports of products under the ban reduced (2013 vs. 2016). The applied import ban had already affected individual countries in 2014 (the first year of sanctions). In 2014 alone, the share of the EU in Russian imports affected by ban reduced from 28% to 17%, and the share of Norway had reduced from 5% to 3%. During 2015 and 2016 the share of individual countries affected by the ban in Russian imports of products reduced even more. In 2016 the share of EU reached only 6.8%, the share of Norway reduced to 0.001%, the share of Canada reached only 0.003%, the share of the USA reduced to 0.58%, and the share of Australia reduced to only 0.0001%.

Russian federation was not able to substitute banned imports from local sources for 100%. The significant part of banned items import was necessary to substitute by imports from under countries (not included into ban list). While the share of affected

countries in Russian imports of banned products was reduced from cc 21% to only 3%, the share of other countries increased from cc 30% to 37%.

EU export of banned items was reduced from 6.5 billion USD to less than 700 million USD. Between 2013 and 2016, the total value of EU exports of vegetables to Russia decreased by 94% in terms of value, and by 95% in terms of quantity. The most affected products were tomatoes (decreased by 199 thousand tonnes), cabbages (decreased by 118 thousand tonnes), carrots (decreased by 91 thousand tonnes), and potatoes (decreased by 80 thousand tonnes). The most affected countries by applied ban are the following: the Netherlands, Spain, Poland and Belgium. On the other hand, the winners of applied ban are China, Turkey, Belarus, and Egypt. Those countries manage to replace European exports to Russia especially in the case of tropical and subtropical production. It means the applied ban not only reduced EU's exports of its own production, but it also affected re-exports.

In the first place, the Russian ban affected the perishable products/fruit sector. Russia represented about 30% of the EU's fruit exports in 2013. The main products concerned were apples, peaches, nectarines and pears. The main EU suppliers of fruits were Poland, Spain, Greece, Italy and Belgium. In period 2013 – 2016, European fruit export was reduced from 1,519 million USD to nearly 70 million USD. The value of exports was reduced by 95% and export volume was reduced by 97% (from 1538 to 40 tons). The most affected countries by ban were the following: the Netherlands, Spain, Italy, Poland and Germany. From Russian perspective, the majority EU's exports were replaced Turkey, Belarus and Serbia. Belarus and Serbia dispose bilateral trade agreements in relation to Russian Federation. Because of import ban, their role as countries supplying Russian market increased especially because of their re-exports.

Another item significantly affected by Russian import ban is represented by Meat and meat products EU's exports. The volume and value of exported meat were reduced by nearly 100%. The value of exports reduced from 1,548 million USD to only 0.5 million USD, and the volume was cut from 472 thousand tonnes to 98 tonnes. The import ban affected trade in all kinds of meat. This significant export reduction particularly affected the trade in pig meat and the trade in poultry meat. Pork meat trade was reduced from 1,548 million USD to 0,5 million USD. Poultry meat trade was reduced from 95 million USD to 32 ths. USD. For specific time period (2014 and beginning 2015), it even destabilized EU pork market. The most affected countries suffering because of applied ban for meat imports are Germany, Denmark, Spain, France the Netherlands, Poland. To compensate missing imports from the EU, Russia increased imports of meat from Brazil, Belarus, Turkey, Argentina, and Serbia. Because of constantly increasing re-exports from Serbia and Belarus, Russia decided to change its attitude to bilateral trade agreements.

The ban applied on fish imports did not affect EU trade performance so much as bans applied on other commodities imports. In period 2013-2016, the value of EU export was reduced from 216 million USD to cc 64 million USD. Trade volume was reduced from cc115 ths. tons to cc 24 ths. tons. In the case of fish trade the most affected country is not EU member. It is Norway.

Between 2013 and 2016, the applied ban reduced EU dairy exports to Russia from 1,738 million USD/year to cc 3 million USD/year. The exported volume was reduced

from 417 ths. tons to only 620 tons. The most affected segments of dairy trade are the following: cheese and curd (export value reduction by 1,272 million USD), butter and milk fats (within analysed time period – the export value was reduced from 184 million USD to less than 100 ths. USD). Countries suffering by applied ban are especially Russian neighbours as Finland, Poland and Baltic countries. Russia substitute EU products by imports from especially the following countries Argentina, Belarus, and Kazakhstan (it is only re-export - it is evident especially in the case of Belarus).

## **4 Conclusion**

The value of agricultural imports from affected countries was reduced by 12,598 million USD i.e. by 66% (between 2013 and 2016). The import from other countries was also reduced by 5,535 million USD i.e. by 22%. Applied ban affected especially those imports which could be understand as competitors for national production capacities (meat and meat products, dairy and dairy products, fruit and vegetable, fish). The potential to substitute those items by local production is evident.

The applied ban significantly reduced especially imports of above-mentioned products by 13,100 million USD in period 2013-2016. Applied ban reduced imports from affected countries from 9,007 million USD to 742 million USD and from the rest of the world from 14,128 million USD to 9,293 million USD.

The most affected region (about the effect of Russian import ban) is the European Union. The applied ban affected imports especially from Lithuania, Germany, the Netherlands, Denmark, Spain, Belgium, Finland and France. Speaking about the most affected countries, in relation to the share of Russian imports in their trade performance, the most affected countries are Lithuania, Latvia, Estonia, Finland and Poland. In period 2013 – 2016, the value of EU imports affected by import ban was reduced from 6,525 million USD to only 683 million USD. Total agricultural EU exports to Russia decreased from more than 15.6 billion USD to less than 6 billion USD. Russian applied policy also affected non-banned items import and it reduced Russian food dependency in relation to the European Union.

In period 2013 – 2016 the value and volume of EU dairy exports was reduced by 1,734 million USD ie. 416 ths. tons, meat exports reduced their value and volume by 1,547 million USD respectively 472 ths. tons and fruits export were reduced by 1,449 million USD respectively 1498 ths. tons. Export reduction also affected vegetables and fish trade activities.

To satisfy domestic demand Russia increased food imports especially from Serbia, China, Azerbaijan, Ecuador, Kyrgyzstan, India, Macedonia, Georgia, Bosnia and Malaysia. The negative feature of applied ban especially for Russian consumers was the reduction of food heterogeneity, the growth of food price, the reduction of competitiveness and available food quality reduction.

The influenced of Russian import ban reduced mutual (EU – Russia) trade in affected commodities from 7.061 million USD/year in 2013 to only 1,429 million USD/year in 2016.

Russian policy also affected EU exports of other food items. Speaking about not banned exports, their value was reduced from 6,495 million USD/year in 2013 to only 4,738 million USD/year in 2016. EU recorded also significant export reduction in these items: beverages and spirits, cut flowers, prepared animal fodder and tobacco products.

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## Job Satisfaction as an Innovative Approach to the Management - Case Study Czech Republic 2013 – 2017

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**Abstract.** The relationship between satisfaction and demographic and personal characteristics such as gender, age, education and occupation is examined in the presented study. In addition, the relationship concerning job satisfaction and some situation-al factors that are related with work such as organization size or ownership in the Czech Republic is also examined. Authors examined the job satisfaction in this study by the main determinants that are affecting job satisfaction and those are the pay, promotion, fringe benefits, continent rewards, supervision, operating conditions, co-workers, nature of work and communication. Authors concluded that the overall job satisfaction is relatively low in the Czech Republic, and job satisfaction levels did not change in the years that the survey was carried out (2013, 2015 and 2017). There were some differences in the level of satisfaction in individual determinants. When the level of satisfaction between the factors inspected changed in the context of investigations, the changes also happened in the context of the time. A question came up within the study and that was whether or not there are further factors that could possibly affect job satisfaction.

**Keywords:** Job Satisfaction, Determinants, Czech Republic, Human Resources.

### 1 Introduction

All organizations would function appropriately if they manage to connect and use material, information, finance and most importantly - human resources in a correct way.

Nowadays perhaps there is no one that doubts that human resources are the most valuable resource for organizations, as they are able to improve the performance of organizations and could affect its overall economic triumph.

Specific employees are representing human resources. Each worker is inherently specific, thus it is essential to consider what affects their performance.

An individuals' job performance is the result of their intellectual response to insights that are raised by in daily events. Human resources are considered as a component of every system and could significantly affect the system by *their abilities and skills, as well as their attitude and emotions*. Everyone evaluates the complexity of the work performed and consider the significance and values that it brings. Also they consider what role they have in a working group, and understand the level of qualifications they

have for teamwork in the team they are working with as well as the organization as a whole. This awareness is the foundation of their confidence and drives their emotional responses to the evolution of external events as well. Positive reactions makes them feel more satisfied, feel proud to belong to the team and also feel happier of meeting their own abilities. On the other hand, negative reactions are the basis for their feelings of dissatisfaction and frustration accompanied by anger at the causes of unfulfilled ambitions, and possibly the fear of the future and anxiety.

Job satisfaction is described in the classical definitions as a positive emotional response and lessons learned from the evaluation of one's work [18, 22]. The rate of job satisfaction contains both the internal and the external satisfaction [24]. Achievement, responsibility and recognition are typical features of the internal satisfaction; whereas the external satisfaction presents pays and other bonuses, relationships with coworkers and working conditions. Job performance is affected by job satisfaction and dissatisfaction could cause fluctuation, absenteeism, and eventually could bring associated costs [12]. Furthermore, job satisfaction and overall life satisfaction are associated [5, 7, 11, 26].

The relationship between satisfaction and demographic and personal characteristics such as gender, age, education and occupation is examined in the presented study. In addition the relationship concerning job satisfaction and some situation-al factors that are related with work such as organization size or ownership in the Czech Republic is also examined.

## **2 Literature Review**

For several decades Job satisfaction has been the focus of studies of organizational behavior. Many companies want to inspect the job satisfaction in relation with their activities to improve the area of management and specifically human resource management. In general, theories that are devoted to job satisfaction and also tools for measuring job satisfaction were developed in Western countries. Leading researches in the study of job satisfaction were conducted in the US and Western Europe; nonetheless, it is not possible to use these models directly to analyze organizational behavior in the Czech Republic. There is no doubt that the globalization of business and the growth of international companies necessitate a more profound understanding of organizational behavior in different cultures around the world. In the Czech Republic there are only a few studies regarding this matter (e.g. [20]).

Some studies have been conducted in Western cultures in recent decades. There are some studies conducted in Taiwan [25], China [15, 17], Russia [16], and the Middle East [1]. There is very low awareness of job satisfaction and factors that influence it in the post-communist countries, including the Czech Republic. The studies on organizational behavior carried out by the countries of Central and Eastern Europe show that some of the changes of contemporary socio-economic developments of these countries are very specific and different from those in western or east-ern countries. Furthermore, living under the communist regime have had long-term implications for the values and beliefs of the citizens [10].

There are only a few studies on small samples that are published in these countries, and are mostly focused on designated professions as follows: Bulgaria - specialists in public relations [14]; Czech Republic – nurses [8], teachers [31]; Estonia - hospital staff [13]; Lithuania – managers [2], dentists [23]; Poland – sellers [4]; Slovenia – nurses [19]. The survey indicates that the choice of professions is not typical, the health sector has been receiving a lot of attention.

The first data on job satisfaction in the Czech Republic has been known since the International Social Survey Programme (ISSP), which also included a module focused on job orientation. Quite a few studies were published from these data [27, 29]. According to the data, the job satisfaction level in the countries of Central and Eastern Europe has been quite low in comparison with the western and northern countries in Europe. Hungary, Slovenia, Bulgaria and the Czech Republic are four states in Central and Eastern Europe among the eight states with the lowest job satisfaction. A repeated survey in 2005 indicated that the job satisfaction rate in the Czech Republic is still one of the lowest (see <http://www.issp.org>). Other published studies have confirmed these facts as well [3, 6].

### **3 Research's Objective and Methodology**

The aim of this study is to analyze the relationship between satisfaction and demographic and personal characteristics such as gender, age, education and occupation is examined in the presented study. In addition the relationship concerning job satisfaction and some situational factors that are related with work such as organization size or ownership in the Czech Republic is also examined.

In order to determine the level of job satisfaction a survey was performed in January and February 2013 and during the same months in 2015 and 2017. The survey was performed using questionnaires - "Job satisfaction survey" Czech version [28].

The questionnaire contained three sections; there were three demographic questions in the first part, and the second part included five questions on the characteristics of the organization (see Table 1).

The "Job satisfaction survey" Czech version [28] was included in the third part and consisted of 36 items. This part was the one used to measure the perception of the job satisfaction level. Subsequently, the following nine determinants influencing the job satisfaction level were derived from the questionnaire: the pay, promotion, supervision, fringe benefits, contingent rewards, operating conditions, coworkers, nature of work and communication. These 36 items were rated by respondents on a six-point scale ranging from strongly disagree (1) to completely agree (6).

Data was collected in co-operation with part-time university students because it was not possible to get a cross-sectional sample. These students work in various kinds of organizations located in at least three different regions of the Czech Republic.

In total 1950 respondents participated in this study in 2013, respectively 1547 and 1574 respondents in 2015 and 2017. However 174 questionnaires in 2013, 77 in 2015 and 98 in 2017 were excluded from the sample because of some errors and missing values. The age of respondents was 17-74 years in 2013 and 16 - 77 years in the same

period in 2015 and 2017; the average age was 36.3 years (SD = 10.80) in 2013, 36.19 years (SD = 10.70) in 2015 and 36.36 years (SD = 11.45) in 2017. Table 1 shows some other selected characteristics of the respondents.

**Table 1.** Selected characteristics of the surveyed sample. (customized processing).

<i>Item</i>	<b>2013</b>		<b>2015</b>		<b>2017</b>	
	<i>Percentage</i>	<i>Frequency</i>	<i>Percentage</i>	<i>Frequency</i>	<i>Percentage</i>	<i>Frequency</i>
<b><i>Gender</i></b>						
Males	42.9	762	42.1	619	45.7	675
Females	57.1	1014	57.9	851	54.3	801
<b><i>Age</i></b>						
Less than 30	32.4	576	32.4	476	35.6	525
30-40	35.2	625	34.7	510	29.2	431
41 and above	32.4	575	32.9	484	35.2	520
<b><i>Years of experience (tenure)</i></b>						
Less than 5 years	44.0	781	42.2	621	48.8	721
5-10 years	29.5	524	29.9	440	27.2	401
11-15 years	11.9	211	12.9	190	10.8	160
More than 15 years	14.6	260	14.9	219	13.1	194

Statistica 8 software was used to perform statistical analyzes for this study.

There were several limitations in this research, for example selection of respondents and demonstration of individual categories etc. Even though these limitations were present, the data provided some results that moved the knowledge of job satisfaction in the Czech Republic forward.

#### **4 Study Results - Level of Job Satisfaction in The Czech Republic and its Determinants**

The level of job satisfaction is shown Table 2 that was identified in surveys. The results of previous studies and in particular the fact that the level of job satisfaction in the Czech Republic is relatively low was confirmed by the survey.

It is evident in the results of the studies that the total level of job satisfaction was 3.73 in the first two surveys, and had slightly increased in 2017 to 3.74 (maximum possible value is 6).

Looking at the results from the individual selected characteristics perspective (see Table 2), we are able to say that men are happier with work, younger respondents, etc.

Slightly more striking differences could be seen between the characteristics of the Organization ownership. In the public / governmental organization the satisfaction level is lower than other types of organizations. According to the job level where the Manager/Supervisor Employee responsiveness we are able to see a higher degree of job satisfaction compared with employees in non-supervisory employee responsibility.

**Table 2.** The average level of job satisfaction according to the observed characteristics in 2013, 2015 and 2017. (customized processing)

<b>Item</b>	<b>2013</b>	<b>2015</b>	<b>2017</b>
<b><i>Gender</i></b>			
Males	3.79	3.78	3.82
Females	3.69	3.70	3.71
<b><i>Age</i></b>			
Less than 30	3.77	3.77	3.79
30-40	3.74	3.71	3.86
41 +	3.68	3.71	3.65
<b><i>Years of experience (tenure)</i></b>			
Less than 5 years	3.79	3.80	3.82
5-10 years	3.71	3.68	3.77
11-15 years	3.61	3.64	3.62
More than 15 years	3.70	3.73	3.65

The average values of the level of satisfaction of individual determinants or factors affecting job satisfaction is presented in Table 3. The determinants as mentioned before are: pay, promotion, supervision, fringe benefits, continent rewards, operating conditions, coworkers, nature of work and communication.

The impact of these determinants individually on total satisfaction has changed. Promotion, pay and operating conditions, and fringe benefits are determinants that reduce overall job satisfaction, as the average level of these determinants is lower than average of overall job satisfaction. In contrast, respondents are most satisfied with the supervision, co-workers, the nature of work and communication. The average satisfaction in these cases is higher than 4.00.

**Table 3.** The average values of the level of satisfaction of individual determinants of job satisfaction (2013, 2015 and 2017). (customized processing)

	<b>2013</b>	<b>2015</b>	<b>2017</b>
Pay	3.18	3.31	3.35
Promotion	2.96	3.04	3.06
Supervision	4.25	4.27	4.24
Fringe Benefits	3.42	3.48	3.51
Contingent rewards	3.45	3.53	3.56
Operating conditions	3.35	3.26	3.25
Co-workers	4.45	4.35	4.40
Nature of work	4.32	4.26	4.22
Communication	4.20	4.07	4.10
<b>Total satisfaction</b>	<b>3.73</b>	<b>3.73</b>	<b>3.74</b>

As shown in Table 3, the overall level of job satisfaction is almost the same (3.73 resp. 3.74), however a more detailed analysis reveals that:

- *The level of satisfaction between individual determinants is different* – Some determinants like promotion, pay, operating conditions and fringe benefits tend to decrease the overall level of job satisfaction since the average level of these determinants is lower than the average overall job satisfaction. Quite the reverse, the overall job satisfaction level is increased by other determinants like supervision, co-workers, nature of work and communication, where their average satisfaction rate is higher than 4.00.
- *There were slight changes over time for individual determinants* (the level of satisfaction was changing during the monitored period) - The overall job satisfaction investigations was changed in individual determinants; specifically, determinants like pay, fringe benefits and contingent rewards experienced some increase, and on the other hand determinants such as Operating conditions, Co-workers and Communication experienced had a decrease in the level of satisfaction.

## 5 Conclusions

In this study job satisfaction was examined with pay, promotion, supervision, fringe benefits, contingent rewards, operating conditions, co-workers, nature of work and communication being considered as the main determinants influencing job satisfaction.

We found out that the overall in the Czech Republic is relatively low and it did not change in the surveyed years (2013, 2015 and 2017). Some differences in the level of satisfaction are apparent in individual determinants, these changes happened in the context of time when the level of satisfaction between the determinants inspected changed in the context of two of the investigations performed.

Are these factors the only things affecting job satisfaction? It is easy to answer this question without a detailed examination and the answer is definitely not, because people live in communities and these communities also affect them. One can almost say quite the opposite, that job satisfaction could be considered as one of the determinants of life satisfaction. Even though the overall life satisfaction, and satisfaction with job and family are often analyzed independently, but it is obvious that these areas are inter-linked; people who are happy in one of these areas of life, usually are satisfied in other areas [30]. As it is stated by Near [21], this can be understood in two ways: initially general psychological disposition toward pessimism/optimism, because the successes/problems in one area of life are reflected in the assessment of the other area. Here we are able to only mention the relationship among satisfaction with work and family. ISSP data approves that though not very strong, there is a connection between satisfaction with family and work (correlation coefficient 0.30 statistically significant at a level of 0.01). The ISSP data does not evidently conclude whether job satisfaction is the most important and is consequently reflected in the positive evaluation of family life, or it is quite the opposite and the satisfaction with family life is the most important and affects the perception of the work in a positive manner. Hamplová [9] states in her study that it is possible to indicate the power of influence by two independent regression models. In the first model satisfaction with family is considered as the independent variable and job satisfaction as the explanatory variable. In the second regression model, job satisfaction is considered as the response variable and satisfaction with family life as the explanatory variable. In the first model, where the independent variable is satisfaction with family and the explanatory variable is job satisfaction, if the assessment of family life worsened or improved by one point, the satisfaction with work would change accordingly by 0.36 points. In the second model, where the independent variable is the job satisfaction and explanatory variable is the satisfaction with family life, if attitude to work changed by one point, the evaluation of family life would change by 0.30 points. According to these findings the affects family life has on the work life are stronger than how work life reflects on family life.

In other studies, it would be suitable to widen the exploration of other determinants like satisfaction with family life, or to examine how job satisfaction could affect life satisfaction.

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## Recent Payment Account Prices Information Asymmetry Reduction Regulation Impact in the EU

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**Abstract.** Approximately ten years after the EU studies and expert groups had collected evidence on transparency issues related to the payment account prices and offer real-world measures came into force. Directive 2014/92/EU (also known as Payment Account Directive) stated that in cooperation with the European Banking Authority and national regulators should be introduced in member states ex-ante indicator Fee Information Document, ex-post indicator Statement of Fees and standardised terms list. The goal of the paper is to perform an early assessment of Fee Information Document adoption linked to standardised terms list in the Czech Republic by payment account providers. The Fee Information Documents of ten Czech and four United Kingdom banks are compared between. The discrepancies in the level of detail, the problem of fragmentation related to payments and overdraft facility inclusion were found. These issues may prevent reaching the goal of the regulation in terms of providing consumers with a document that is concise, standardised and easy to compare different payment account offers.

**Keywords:** Payment account, Regulation, Directive 2014/92/EU, European Banking Authority, Fee Information Document.

### 1 Introduction

The information asymmetry is natural imperfection regarding any real-world market and so there is no reason why the market of payment account (PA, PAs in plural) for individuals should be an exception. The paper is focused on accounts through which consumers are able to carry out funds placing, cash withdrawals, execute and receive payments to and from accounts of another provider. Therefore, any other account not providing all such services, e.g. electronic wallets, pre-paid services accounts, credit card account, is beyond the scope.

EU studies and expert groups [3, 10, 19] collected evidence focused on issues of transparency in form of incompleteness, complexity and the links between financial products. Two main aspects were identified; how clear and comparable is information provided to consumers and; how aware consumers are of the fees they are charged. Other local empirical studies were in accordance to the conclusions such as [17], TNS at the request of D-G for Health and Consumers, Office of Fair Trading, UK Independent Commission on Banking, UFC-Que Choisir etc. Generally speaking, fees

and costs related to banking products tend to be one of the main reasons for consumer complaints. It is particularly in terms of a lack of transparency that impedes consumers from making well-informed choices; the comparability of fees; and pricing.[6] There was observed an increase of PA related complaints in 2017 with EU average of 49% of all complaints received by competent authorities.[7]

The Directive 2014/92/EU [11] (also known as Payment Account Directive) was adopted as an action to remove barriers to competition within the internal market and to increase a consumer protection in retail banking. Understanding the fees is a prerequisite for being able to compare PA offers and key for consumers to make informed decisions. Therefore, two indices and one enabler/enhancer tools were introduced in the [11]; ex-ante indicator Fee Information Document (FID, FIDs in plural), ex-post Statement of Fees (SOF) and standardised terms glossary. After the transposition of [11] into national legal environment and with assistance of European Banking Authority (EBA) PA providers in member states started to publish their FIDs at the beginning of the winter 2018.

The goal of the paper is to perform an early assessment of this effort to provide consumers with information that is concise, standardised and easy to compare between different PA offers. To reach this goal the FIDs of the Czech PA providers will be compared between and to United Kingdom's (UK) FIDs. An attention paid to the PA market is justified since the importance of the PA product is great. EU sees barriers on the PA market as barriers to the deployment of a fully integrated market [11]. Both EU legal bodies as well as academicians stress also a social function of the PA. EU acknowledges that socially inclusive economy increasingly depends on the universal provision of payment services. depicts The study [4] points out a positive relationship between gross domestic product and an access to basic banking services (current account and payment services) and credit and [1, 13] connects the financial inclusion with an overall bank system stability.

## **2 Research and Methods**

### **2.1 Payment Account and Information Asymmetry Reduction Effort**

In general, providing clear and comparable information on service offers is a prerequisite for the free operation of market forces. Although it is difficult to measure the level of market imperfections, e.g. in form of dead weight costs, caused by non-transparent, incomparable fee information, it is likely that all consumers are adversely impacted by these issues at some point. A certain approach was adopted in the study [17] where an optimal PA choice was assessed accordingly the range of demanded services and the price paid for a PA that offers such services. The analysis was consisted of consumers with activated e-banking, using basic account features, see. [11], no service demanded at a branch. The 95% confidence interval for mean of optimal choice was (20.45; 21.28) in %. Such low values were explained by multiple factors but the main one was related to information asymmetry in for of lack of price transparency combined with a low expected rate of return.

EU-wide studies were performed, and expert groups formed to further describe and analyse this issue. Expert group point of view was that: “Consumers tend to use imperfect proxies for identifying alternative products (brands, reputation, proximity) instead of prices and contract terms and conditions”[10] However, the main result of the report related to the problem of transparency. PAs prices are difficult to compare because the information is available in a way that implies high search costs. Those costs come from the problem of tariffs incompleteness, complexity and the links between financial products. The latter issue of links between financial products does not relate to natural links but tying, bundling, conditional sales and cross-selling practices. Such practices even further increase overall complexity of total price calculation and so the problem of transparency as well. The most common in the Czech Republic would be conditional practices which relates to offers that entail better contract conditions or price reduction if certain condition is met. This one is also known for so-called loyalty prices. These problems practices studied in [3] and the magnitude and spread of the practices was substantial: “More than 50 % of providers estimate the share of consumers involved in some form of bundling higher than 80 %. Mixed bundling with rebates relates to 35 % and without rebate 60 % of consumers”. The third study to be mentioned was to deal with the comparability issue. The main findings were that comparability varies across the EU and at the same time there is a negative correlation between the price (costs) and the level of transparency [19]. Also, the researchers had problem in price calculation even though their test profile was not very complex. They had to contact 40 % of the providers to confirm data collectors’ interpretations of prices or additional tariff clarifications. 33 % the price information in their tariff lists was found to be incomplete. Thus, EU consumers bear a negative outcome of this information asymmetry related to both the real nature of the service and mainly to the price transparency issues. In general, PA fees are the most common reason of consumer complaints in the EU [6, 7].

An effort to tackle the issues related to information asymmetry lead to the Directive 2014/92/EU which was later in the Czech Republic transpositioned by the law no. 452/2016 Coll. Among other tools, such as comparison websites, the directive introduced:

- List of standardised terms: standardised terminology was introduced in order to overcome an issue, that payment service providers use different terminology for the same services and provide information in different formats. The terminology should have covered the most representative services linked to payment account. This list should have been an enabler or at least experience enhancer for the next two obligatory documents accompanying the offer and use of PA.
- Fee information document (FID): FID states the fees for all services contained in the list of the most representative services linked to a payment account at national level. The FID should use the standardised terms and definitions established at EU level. The FID should not contain any other fees. Where a payment service provider does not offer a service appearing in the list of the most representative services linked to a payment account, it should indicate this by, for example, marking the service as ‘not offered’ or ‘not applicable’. PA provider should provide the consumer, in good

time before entering into a contract for a payment account with a consumer, with a FID on paper or another durable medium. Therefore, the FID serves as an ex-ante fee indicator.

- Statement of fees (SoF): ex-post fee information should be provided in a dedicated document. It should provide an overview of interest earned and all the fees incurred in relation to the use of the payment account to enable a consumer to understand what fee expenditures relate to and to assess the need to either modify consumption patterns or move to another provider. SoF should be presenting the most representative services in the same order as the FID.

Member states mostly through their bank market supervisors submitted lists of the most representative services related to fees charged at PAs to EBA. After the consultation period EBA had published the list of standardised terminology for PA those services that are common to at least a majority of member states.[8] EBA drafts then came into force by the Regulation EU 2018/32 [9] and in member states it usually came into force in form of a regulator's decree such as the case of The Czech Republic [5]. The decree came into force on October 31<sup>st</sup>, 2018 providing final list of most representative services linked to payment account and fees in the Czech Republic.


## 2.2 Comparison

Since the paper is focused on the [11] impact on the retail PA offer, the attention was paid at first on the difference between the EU and Czech list of standard terms including services and their aspects. Compared account are chosen to be mainstream PA without features for affluent consumers or consumers that comply any other special conditions related to age, income etc. The next part compared the length and structure of FIDs that have been already available in the Czech Republic. The aim is at the most complex parts of the FIDs since the FID should above anything else easy the comparability and offer. Then the results were compared to the FIDs of global systemically important banks with headquarters in the UK. Global systemically important banks were chosen since activity of certain banks is essential and irreplaceable for the whole economic activity [18]. This group represents the most important bank institutions in the world accordingly the criteria of size, cross-jurisdictional activity, system interconnectedness and other variables since 2009. This state lasts till now in 2018 [2] and this group continues to be more systematically important than other banks, implying that perception of “too-big-to-fail” remains or as [18] notes “too-interconnected-to-fail”. Their key role in the financial system also puts them in a position where their problems rapidly spread over to non-systemic financial institutions. [14] The importance of such banks is obvious and because they take part in the retail banking they were chosen as a sample the Czech PA offer to be compared to. The data were collected during the second week of December 2018. The fig. 1 shows the result of EBA effort to prepare FID accordingly the [11], EBA's own testing with consumers in a qualitative and quantitative consumer-testing exercise, and consultation on them between September and December 2016. The FID is divided into groups of services:

- General Account Service,
- Payments (excluding cards),
- Cards and cash,
- Overdrafts and related services,
- Other services.

Bank  
brand

**Fee Information Document**



**Name of the account provider:**

**Account name:**

**Date:**

- This document informs you about the fees for using the main services linked to the payment account. It will help you to compare these fees with those of other accounts.
- Fees may also apply for using services linked to the account which are not listed here. Full information is available in [specify names of the relevant pre-contractual and contractual documents].
- A glossary of the terms used in this document is available free of charge.

Service	Fee
<b>General account services</b>	
[main service] [brand name]	[•]

**Fig. 1.** Sample of obligatory FID template developed by EBA, annex of [8].

## 3 Results

### 3.1 Standardised terminology

Standardised terminology is the base of the FID. The table below compares all member states common standardised terminology and Czech final list of the most representative services linked to a PA and subject to a fee.

**Table 1.** Table captions should be placed above the tables [5, 9].

Standardised terms for services	Commission Delegated Regulation (EU) 2018/32	Czech National Bank Decree No. 74/ 2018 Coll.
Maintaining the account	included	included
Providing a debit card	included	included
Providing a credit card	included	not included
Overdraft	included	partially included
Credit transfer	included	included in greater detail
Standing order	included	included
Direct debit	included	included
Cash withdrawal	included	included
Sending an informative SMS	not included	included
Monthly statement	not included	included

The table shows some national differences to the list of standardised terms by EBA. This is the result and in accordance to [11] article 3(1). Yet, for the first sight, it may be surprising that the credit card provision is not included in the Czech final list of the most representative services linked to a payment account and subject to a fee. Nevertheless, banks in the Czech Republic provide credit cards in a different way which not linked with the payment account. A credit card provision and usage in form of a loan contract and it does not even require the client to have a payment account at the bank he or she applies for a credit card. The overdraft facility is included only in form of a note that a debit card allows to dispose of money including previously arranged authorized overdraft. Nevertheless, the overdraft itself in terms of interest rate of fees for a PA balance below zero etc. is not included since provision of a debit card is not fixed on authorized overdraft. Credit transfer was included in a slightly greater detail separating incoming and outgoing payment. Two items were added to the Czech final list in comparison to the list from the Regulation [9]. These two items came from the national provisional list submitted to EBA because they act in almost all PAs' price lists in the Czech Republic as services not provided for free.

### 3.2 Fee Information Document

FID comparison was at first focused on the global systemically important banks and the PAs they offer at a country of their origin i.e. headquarters. The adoption of FID was faster in the UK, Scandinavia or the Czech Republic compared to France and Germany also due to a national regulator. Therefore, the table below contains mostly UK banks.

**Table 2.** FIDs of global systemically important banks overview in the country of origin.

Bank	FID	Account	Pages	Most complex group of services
Barclays	yes	Barclays Bank Account	3	Payments (excluding cards): various conditions applied to domestic, cross-border, and international payments (especially overseas).



HSBC	yes	HSBC Bank Account	1.5	Payments (excluding cards): various conditions applied to mostly domestic (network type, communication channel) and outside UK.
Royal Bank of Scotland	yes	Bank account Select	2	Overdrafts and related services: arranged an unarranged overdraft
Standard Chartered	yes*	---	---	---
Royal Bank of Scotland	yes	Bank account Select	2	Overdrafts and related services: arranged an unarranged overdraft

\*only private banking is offered in the UK (year fee equivalent to 3.000 USD) which is a very specific market segment beyond the scope of the paper.

The table shows that implicit goal (comes from the consultation prior to the [8]) of a single sheet of two pages where the consumer will be briefly informed was mostly achieved. This goal was mentioned also in the discussion during the EBA preparation of [8].

Only two bank The situation in the Czech Republic is ahead of most of other European countries when there are only a few exceptions among bank with a republic-wide retail network.

**Table 3.** FIDs of banks with a republic-wide retail network in the Czech Republic.

Bank	FID	Account	Pages	Most complex
Air Bank	yes	Malý tarif	1.5	General account services: package of services
BNP Paribas Personal Finance (Hello bank)	yes	Běžný účet	1.5	General account services: detailed options concerning a debit card provision
Česká spořitelna	yes	Účet s MZF*	3.5	General account services: packages of services
Československá obchodní banka	yes	Plus Konto	4	Payments (excluding cards): various conditions applied to domestic payments (communication channel, establishing, execution, change of payment, priority) and cross-border payments (communication channel, amounts) and more
Československá obchodní banka (Poštovní banka)	yes	Poštovní účet	3.5	Payments (excluding cards): various conditions applied to domestic payments (communication channel, establishing, execution, change of payment, priority) and cross-border payments (communication channel, amounts) and more
Equa bank	yes	Běžný účet	1.5	Payments (excluding cards): different types of incoming and outgoing payments
Fio banka	no	---	---	---
Komerční banka	yes	MůjÚčet	5	Payments (excluding cards): two pages of various conditions applied to payments (type, territory, communication channel, establishing, execution, change of payment, priority, inter or intra-bank, amounts and more)

mBank	yes	mKonto	4.5	Cards and cash: four different types of cards each with some differences in cash utilization, maintenance fee, second card option etc.
Moneta	no	---	---	---
Raiffeisenbank	no	---	---	---
Sberbank CZ	yes	FÉR konto MINI	2	Payments (excluding cards): various conditions applied to mostly cross-border payments
UniCredit Bank Czech Republic and Slovakia	yes	U konto	5	Payments (excluding cards): two pages of various conditions applied to payments (type, territory, communication channel, establishing, execution, change of payment, priority, inter or intra-bank, amounts and more)

\*PA „Účet s Moje zdravé finance“ was chosen since the FID is not available for the most common account "Osobní konto".

The table shows that the main retail banks in the Czech Republic (Česká spořitelna, Komerční banka, Československá obchodní banka and UniCredit) published the longest and overall the most complex FIDs. Nevertheless, mBank that was one of the first low-cost e-banking oriented AP provider in the Czech Republic published the FID of the same length. Yet, the factor of complexity differs and so the complexity assessment is more complicated. Different detail was observed regarding e.g. the card service. Most of the banks included the information on the costs of providing a debit card or cards but mBank and Hello bank included a different ways of card delivery such as door-to-door courier service, different card types, the first and the second possible card to PA etc. Similarly, some banks included a very detailed options regarding the priority of the payments.

Another difference is related not the level of detail but to packages. Most of the banks included packages in the first part General account services but some banks included package options at the end of the FID in Other services or in a case of Česká spořitelna there are two special boxes Service package. These boxes are situated at the end of the FID even though one package of services is already present in the first category General account services. The mBank also included one package in the last part of the FID however this package was just a volume sale of informative SMS messages. This is in accordance to [5] and a case other than Česká spořitelna with package concerning the cash withdrawal and the second one concerning payments.

Yet, the most complex part was related to payments (excluding cards). It arises from a fragmentation of tariffs and price lists by various criteria:

- payer or payee,
- territory,
- communication channel,
- payment instrument,
- operation,
- priority,
- amount,

- bank or bank group,
- cancellation.

Text-book examples of such fragmentation approach are Komerční banka, Československá obchodní banka and Poštovní banka. The last one also included a fee for SEPA payment in a way that e.g. SEPA payment established by electronic means costs 250 CZK but right below then there is “+250 CZK”. This means that per SEPA item the fee is 250 CZK but then at the end there is a fixed sort of manipulation fee of additional 250 CZK.

The FIDs did not contain information on an authorized overdraft in spite of being a part of the debit card provision term in the final list of the most representative services in the Czech Republic. The banks were supposed to either provide an information on overdraft on mark the service as ‘not offered’ or ‘not applicable’. It is true that the final list of the most representative services in the Czech Republic only suggest overdraft inclusion in form of “in the case of an agreed overdraft facility”. Nevertheless, most of the banks do offer an overdraft allowing to use credit money through the debit card.

## 4 Discussion

The Czech final list of the most representative services linked to a PA and subject to a fee differs accordingly the local difference to other member states. Missing credit card provision could be explained by the more loan-service than PA-service approach and the next interpretation is that the provision itself is not a source of the fees. Even though the credit card would be linked to the PA then the interest and grace period would be included instead of a provision fee. These two features are the most determining concerning the total costs and the consumer’s decision making. The way how the authorized overdraft is included in the Czech final list of the most representative services linked to a payment account and subject to a fee leaves great space for banks how and whether to include any overdraft information at all. However, generally speaking, the goal that the fee terminology should only be standardised for the most representative terms and definitions in order to avoid the risk of excessive information, was achieved in the Czech Republic. The problem lies elsewhere – the level of detail and the fragmentation.

It seems that different banks took a different approach i.e. choosing a bit different level of detail. There are banks such as mBank and Hello bank which included a very detailed options related to a debit card provision, card types and usage. On the other hand, Komerční banka offers different types of debit cards as well but only one type is included in the FID. Moreover, there are different fees related to debit card “Embosovaná karta” and “Plus karta”. The difference in the level of detail may confuse a consumer and mBank’s FID could be shorter by almost three pages making it shorter by approximately 60%. The level of detail creates a similar problem to package incorporation. For example, Česká Spořitelna included one package of services into the first part of the FID and two more packages of services into the last one. On the other hand, most of the banks provide a package of services information in the first part as it was meant to. Packages of certain pre-paid usage frequency of one particular service

are mostly included at the part where the service is described (e.g. informative SMS package). To sum the problem up, the different level of detail may render the FID incomparable and confusing for a consumer.

The service fragmentation was present especially in the FIDs of the largest retail banks. The most complex FIDs contained 8 or 9 payment criteria prolonging the document into 4 or 5 pages. Such FID is mostly just a part of the price list which was an original source of complexity and transparency issues. An obligatory duty to provide a consumer with the FID on paper or another durable medium then leads to just printing a significant part of a price list which is already published. The idea to include in the standardised fee terminology only the most representative services in order to avoid the risk of excessive information was correct. The Czech National Bank was following it in [5]. Yet, due to a different level of detail and different pricing methods the goal to provide relevant information in a way that enhances comparison and transparency is not achieved.

It is unclear why no information on overdraft was provided in the surveyed FID of the Czech PA providers. Most of them offer authorized overdraft facility and yet there is no information on overdraft fees and neither an interest rate. This is in a sharp contrast to the UK. It is true that an overdraft is much more frequently used by much larger share of consumers than in the Czech Republic, yet it is a part of the EBA's list of the most representative services linked to a PA. Therefore, it would be confusing for a consumer at least from other EU member states not to find an overdraft information in the Czech FIDs.

The result interpretation of the comparison between global systemically important banks and the Czech retail banks is firstly that there is much larger variety in the Czech Republic. The variety does not refer to only range of services but mainly to variety of the fee structure. This finding is in accordance with studies [3, 12, 16, 19] identifying large variety of fees and charges that as a result decrease the transparency of the PA offer. Nevertheless, the result can be much different in a near future since now only a small sample of global systemically important banks' FIDs available at the moment (the second week of December 2018).

## **5 Conclusion**

Approximately ten years after the EU studies and expert groups [3, 10, 19] had collected evidence on transparency issues related to the PA offer real-world measures came into force. EU commission by the directive [11] instructed EBA to issue guidelines [8] to assist the member states in preparation of three main instruments: list of most representative services linked to PA and fees, FID and SoF. The decree [5] came into force on October 31<sup>st</sup>, 2018 in the Czech Republic and so the retail banks started to publish the FIDs accordingly.

The content of each fee information document provided to consumers depends on the individual payment service provider's offer of services and on each member state's final list of the most representative services linked to a payment account. Yet, the adoption approach to FIDs shows discrepancies among the Czech PA providers as well

as compared to the UK ones. The main identified issues are firstly related to a different level of detail mainly in debit card provision and services. Secondly, there is significant fragmentation in the main PA providers' FIDs. Banks such as Česká Spořitelna, Komerční banka, and Československá obchodní banka included a large variety of criteria according to which the payments are charged. Up to 8 criteria for payment fee distinguishing are applied in their FIDs at the same time. This increased the length of such FIDs up to 4.5 pages which is e.g. more than double the pages of FIDs in the UK. Thirdly, only Česká Spořitelna and UniCredit included at least some information about an overdraft facility in spite of the fact that an overdraft is part of the EBA's list of the most representative services linked to a PA. This situation was caused likely by only partial inclusion of an overdraft in the Czech final list of the most representative services linked to a PA instead of a separate item. These are the main issue to be tackled with in a future otherwise the regulation goal will not be fulfilled in terms of providing consumers with document that is concise, standardised and easy to compare different PA offers.

The next research should follow the changes in the pricing and FIDs of the banks during the next year to study whether it will cause some reaction. It is not for the first time when EU directive last time EU directive intervention changed the PA fees situation and caused step-by-step fee transfer to other PA services or other financial products [15]. Second aim of the next research should compare the FIDs among more countries as the PA providers will one-by-one publish their FIDs in the next year.

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## Approach to Innovations in Rural Communes

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**Abstract.** The aim of the article is to discuss the implementation of innovation in rural areas. Rural areas are perceived as less innovative than urbanized areas. This also applies to agriculture. In addition, there is a large diversity of development and implementation of innovation in agricultural activity. The research was conducted on the example of 30 farms located in rural Warmia Mazury. The agriculture of the Warmian-Masurian Voivodship requires a high level of technical utilities and cause that unit costs of agricultural production are higher, while profitability is lower than in other regions of the country. Direct interviews were conducted to obtain accurate information. The original interview questionnaire contained 9 questions concerning mainly introduced innovations, reasons for not undertaking innovative activities and respondents' opinions on the benefits of such activities. The information obtained and the results of analyzes allowed to indicate the main types of innovative activities implemented in selected areas. However, the scope of activities was limited. Farmers were not convinced to introduce such activities in their own farms and expected support from the state or EU funds. All respondents were unanimous that Poland's entry into EU structures gave Polish agriculture a great chance to improve farms situation. The research results also indicate that providing farmers better access to knowledge in the field of innovation can raise the innovation rate in the area of agricultural activity. In addition, respondents would like the commune authorities to work on improving the region's competitiveness and social inclusion.

**Keywords:** Innovations, Agriculture, Rural Areas.

### 1 Introduction

Contemporary Polish economy to be able to compete with the economies of such countries as Germany or France must place a special emphasis on research and development, science and, above all, the resulting innovations for implementation by native enterprises. Especially that innovations are a priority of the European Union's socio-economic development program, which is confirmed by the creation of the Innovation Union. The Community, through a range of tools, encourages Member States to invest in research and development at three percent of their GDP by 2020 [5]. At present, the areas of special interest of the Union are: food security, energy, aging of societies and climate change, therefore the implementation of innovations especially

in these aspects of the Community's functioning is a priority. Unfortunately, according to the European Innovation Ranking 2018, Poland and most of the New EU countries occupy the last places in terms of innovation implementation. In this respect, the cause may be social unwillingness resulting, for example, from a lack of education in this area. The way to solve this is cooperation, innovation is no longer regarded as an individual but as a network process [10]. One example is the "Cooperation" action, which was included in the Rural Development Program 2014-2020. The aim of this measure is innovative partnership and the formation of operational groups for innovation in the agricultural sector [17]. However, there is a large variation among Polish provinces, visible inter alia in the level of GDP (the level of GDP discussed in the article of the Warmian-Masurian Voivodeship constitutes 71.3% of the national average [6]), Therefore, it should be borne in mind that also the innovation indicator in the voivodship section will be very diverse.

## 2 Theoretical Basis

Poland's accession to the European Union had a significant impact on the improvement of Polish agriculture, for example due to the necessity to adjust Polish production to European standards. Technological or organizational development of Polish producers and entrepreneurs was necessary to remain on the market [3]. The changes affected everyone, albeit not uniformly. It is well known that rural areas are perceived as less innovative than urbanized areas [2]. The difference between cities and rural areas is not the only one. There is a high regional diversity in Poland in the level and dynamics of development resulting from a number of different aspects, including natural conditions such as the vegetation period, terrain configuration or soil diversification. These features make the agriculture of the Warmian-Masurian Voivodeship require a high level of technical utilities and cause that unit costs of agricultural production are higher, while profitability is lower than in other regions of the country [14]. In this situation, innovation is an opportunity for the community of this region, as Schumpeter said, innovation is a chance for firms to pursue economic rent in the short-term [4]. The results of the Szwicka-Mokrzycka research show that the factors that have the strongest impact on the development of innovation in the agri-food sector (research in the Podlasie Voivodeship - 0.4% of GDP less than in the region discussed in the article) is the help of EU funds or state support, i.e. use of external sources of financing [15] and also access to informations. Maciejczak also emphasizes that funds from the EU funds allowed to finance innovative investments in both medium and large farms [8, 9]. Among innovations Kaluza and Ginter specify such categories:

- innovation in the field of plant production: new fertilizers and plant protection products, new crop species and varieties, new technologies, purchase of machinery and equipment, soil analysis, certified seed, increasing the area of arable land at the expense of permanent grassland;
- innovation in the field of livestock production: increasing the cattle and pig population, construction or modernization of livestock rooms, improvement of



animal welfare, installations of new machinery and equipment, new species and breeds of animals, changes in animal nutrition;

- general farm innovations: purchase or lease of land, construction or reconstruction of premises farms, purchase of machinery, equipment and tractors, implementation of computer technology, new forms of work organization on the farm, searching for new sources of income [7].

There are many innovativeness classifications depending on the criterion adopted. Skornicki accepted the division into criteria: the form of innovation (tangible and intangible), the degree of innovation complexity (unconjugated and coupled), objective (product, process, marketing and organizational), the mechanism of stimulating innovation (supply and demand) [13]. However, regardless of the breakdown, the increase in innovation was identified in the RDP 2014-2020 as one of the main needs on the way to the development of Polish agriculture. Innovation can significantly affect the improvement of productivity and increase the competitiveness of the agricultural sector, as well as improve the quality of products, which in turn may contribute to increasing farmers' incomes [1]. At the same time, innovative solutions may be conducive to adaptation of agricultural activity to the needs of the environment [11, 12, 16].

### **3 Methodology**

The study analyzes the farmers' innovative activities in their farms. The aim of the research was to identify and evaluate the implementation of innovative solutions and their application in agricultural farms. Primary and secondary sources of information were used for analyzes. Empirical research on application and approach to innovation was conducted in the form of interviews in the third quarter of 2018 among thirty farm owners in the Warmian-Masurian Voivodeship. These studies constituted a farmer's approach to implementing innovations in their farms. 56% of respondents were women, and 44% were men. The vast majority, as many as 70% were people aged 46 to 59. Respondents used land from 2 to 14 hectares. The study used the author's questionnaire. The results of the research were developed statistically and graphically. Secondary sources of information came from the subject literature and statistical studies of the European Commission.

### **4 Results**

Farmers responded to the question about already realized an innovative venture (see Fig.1). Among the respondents only 20% have such an experience already made. In the case of planning the implementation of innovations (see Fig. 2), one more respondent answered that is going to run some innovative activity. Another 23% respondents answered that is hard to say. The respondents who answered so, were asked to define why it is "hard to say", what it depends on, answers were as follows:

- it depends on the support of the community,
- it depends on whether there will be some EU funds,
- it depends on whether the state will give funds for it,
- it depends on health.



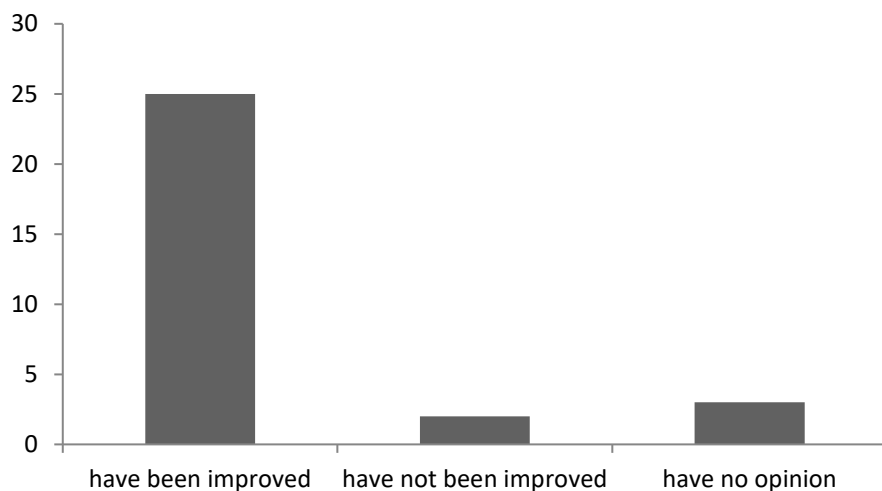
**Fig. 1.** The respondents who implemented innovations on the farm before the interview.



**Fig. 2.** The respondents who plan to implement innovations in their farm.

Among introduced or planned innovations in the surveyed farms there were: lease or purchase of land, renovation of buildings, construction of a lodging, purchase of a machine, creation of an additional source of income.

Respondents also answered the question about the possibilities of farming since Poland was included in the Rural Development Program (RDP). A large majority decided that opportunities for farming since Poland is included in RDP have been improved, whereas nobody decided that farming opportunities have been deteriorated (see Fig. 3).



**Fig. 3.** Opinions of respondents regarding the opportunities for farming after including Poland the RDP program.

Also respondents were asked to indicate what types of innovations (in their opinions) are profitable to implement in the local area. Respondents defined profitability using a five-point scale. Each responder had to award two best options.

**Table 1.** The level of profitability of innovation in the opinion of respondents [in %].

Innovation type	The most common answer	Share [%]
Innovations in the plant production	3	70
Innovations in the livestock production	3	47
Innovations for expanding/improving the farm	5	80
New sources of income	4	53
New work organization	2	47
New technology	4	57
Others	3	63

The highest scores (5) were given to the answers of the expansion, farm enlargement, namely the general farm innovations. At the good grade (4), respondents also assessed the possibility of implementing a new source of income in their farms and also the possibility of start using new technology in their work. The new organization of work

on the farm was poorly assessed (2) as unprofitable for the local conditions of the respondents. The "others" section contained such innovations as: soil analysis, certified / genetically modified seed and it has been assessed rather unfavorably (3).

The Warmian-Masurian residents were asked to indicate which of the proposed projects should be developed by the commune and poviatic authorities. Each responder had to award two best projects. The authors proposed the following undertakings:

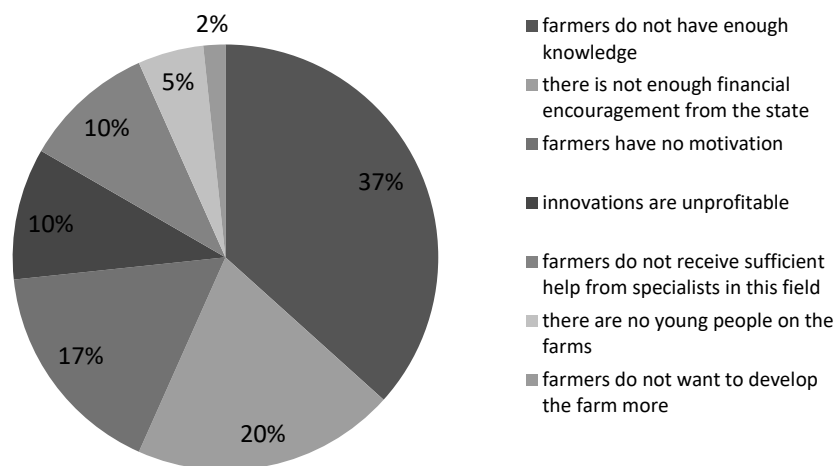
- facilitating knowledge transfer and innovation in agriculture and forestry in rural areas (3%),
- improving the competitiveness of all types of farming and increasing the profitability of farms (35%),
- improving the organization of the food chain and promoting risk management in agriculture (8%),
- recreation, protection and strengthening of ecosystems dependent on agriculture and forestry (3%),
- supporting resource efficiency and the transition to a low-carbon and climate resilient economy in the agricultural, food and forestry sectors (5%),
- increasing social inclusion, reducing poverty by promoting economic development in rural areas (45%).

The most important undertakings that the commune and poviatic authorities should have developed are for the respondents: increasing social inclusion, reducing poverty by promoting economic development in rural areas, that is, social aspects and help entrepreneurs in improving the competitiveness of the agricultural economy and increasing the profitability of farms, so the management issues.

Furthermore, respondents were asked about their opinions why farmers from the region are not willing to implement innovations. The following are the most common answers:

- innovations are unprofitable,
- farmers do not have enough knowledge,
- farmers do not receive sufficient help from specialists in this field,
- farmers do not want to develop the farm more,
- farmers have no motivation,
- there are no young people on the farms,
- there is not enough financial encouragement from the state.

The figure 4 shows the number of indications given to the reasons for not implementing innovation.



**Fig. 4.** Respondents indications why farm owners do not want to implement innovations [in %].

It was examined that despite a significant stimulus to implement innovations which is the possibility of obtaining external funds, the lack of knowledge in the field of innovation was the main reason for the lack of innovation initiatives on farms. This is logical, because currently in the region, in Poland and in the European Union, there are projects, funds for innovations that would definitely help farmers to innovate, but to reach for them, farmers should have knowledge, an idea for innovation, but this knowledge is lacking.

## 5 Conclusion

According to analyzes of respondents' answers, the willingness to implement the innovation is largely restrained by a lack of innovations' field knowledge. Among the small percentage of people who implemented innovations, the most popular were general farms innovations: purchase of land, lease of land, construction / reconstruction of farm rooms, purchase of machinery and equipment or modernization of buildings. The majority of interviewed farmers stated that since the Polish was included in the RDP, the farming opportunities have been improved. However, what the commune and poviat authorities should pay special attention to are increasing social inclusion, reducing poverty by promoting economic development in rural areas and help with improving the competitiveness of all types of farming and increasing the profitability of farms. It is worth noting that both of these aspects can be taken care of by

implementing innovations or assistance in implementation, for example by providing/transfer knowledge to local producers and entrepreneurs..

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# Impact of Personality Traits (BFI-2-XS) on Use of Cryptocurrencies

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**Abstract.** Cryptocurrencies are around for less than a decade but their usage steadily increases. There is no doubt that functional, social (cool-factor) and financial (high risk – high reward investment) motives drive its adoption and usage. But it is also worth to investigate whether personality and demographics can play some role in the adoption. The research have focused on impact of personality traits (according to the Big Five Inventory framework) on the usage of cryptocurrencies. The research was conducted in the Czech Republic. Respondents were university students, 478 in total (272 male, 206 female; 20.5 years old on average), of whom 62 respondents indicated that they use cryptocurrencies. Gender, age, and type of student job were used as control variables. With regards to the results, openness to experience, gender, and type of student job influence the adoption. Subjects more open to experience, male, and working full time in the field they study use cryptocurrencies more.

**Keywords:** Personality Traits, Cryptocurrencies, Adoption.

## 1 Introduction

Digital currency, a means of exchange used in on-line environment, is wider than just credit card number used for on-line shopping. The digital currency includes virtual currencies and cryptocurrencies. Because it is a relatively new area, a universal definition that would define individual terms, and in particular their legal personality is very difficult. In 2012, the European Central Bank defined virtual currencies as the type of unregulated digital money that is emitted and usually driven by their developers and their use and acceptance is limited to members of a virtual one communities [3]. An example is the various types of "money" used in online games or other communities where the use of such currency is accepted.

The widely used are cryptocurrencies. By definition, this is a type of digital currency, which uses cryptography to secure transactions and to control the issuance of new units of currency. The common characteristic of cryptocurrencies are mainly its decentralization, which is in contrast to ordinary digital currencies that are centrally controlled by governments or other institutions, as well as normal physical money. Neither the production of units of the respective currency it is not within the



competence of one entity that could influence the price of the currency in this way, as is the case with central bank interventions. In contrast, currency issuance occurs collectively the entire system of the given cryptographic and the rate of issuance of new currency units is defined with the origin of the system and is publicly known. Generally, new coins are created so that their amount decreases over time to the point where they are the circulation of the whole, pre-programmed and publicly known number of coins.

Another feature of cryptocurrencies is their transparency. This is due to the use of public a database called a blockchain. This database records all transactions on the network and the database itself serves as a public accounting book that is under constant public control and in combination with cryptography makes it possible to prevent unauthorized users transactions. Thanks to the blockchain, each user has the ability to view anytime the transaction that took place in the network, and at the same time determine the amount of digital currency to what address. In practice, the technology works like any computer connected to a distributed node network, it has a copy of the blockchain that synchronizes with its copies users and each new transaction that users make is recorded in the string of previous transactions, respectively. a series of transactions creates a so-called block that is then grouped into a string of blocks. Such entry can no longer be changed because of the individual blocks in the string refer to the previous block, and it is also necessary to change the data in the previous blocks.

There are currently more than 1620 different cryptocurrencies with open source codes and everyone can create their own currency with specific parameters, 21 of them exceed the market capitalization of over a billion dollars [2]. The most famous, the most widespread and the oldest decentralized cryptocurrency is Bitcoin, however its main weakness for becoming a really global payment system is its low transaction throughput. Currently, there are some new ideas how to increase the transaction throughput, with different scalability of the system, and new generation of cryptocurrencies have emerged.

## **2 Usage of Cryptocurrencies**

Anonymity is the main characteristics which makes cryptocurrencies popular around the world [8]. Due to the illicit usage of Bitcoins, the degree of anonymity was reduced although its users are still using anonymizers like TOR to keep the anonymity stronger when they connect to the Bitcoin network. The forensic tools could be used to follow the web browser activities, cookies, local drive, hard disk image, downloads and session data related to Bitcoins. The attacker can identify the transaction of the specific users and by even delaying the transactions can control the Bitcoin block. Herrera-Joancomarti and Perez-Sola [5] proposed some scalability solutions for the Bitcoin network and outlined its influence on users' privacy.

Grigaliune et al. presented the analysis of Bitcoin usage opportunities in international settlements, focusing on imperfections of the legal framework that create the barriers to treat cryptocurrency as an alternative to fiat currencies that are employed for settlements all over the world [4]. Germany can be treated as the country, most advanced in the area of Bitcoin usage regulation: meanwhile Russia and China treat

Bitcoin as a criminal currency with poor measures of consumer protection. Grigaliune conclude, that Bitcoin can be treated only as an alternative to traditional measures of settlement, but not as a substitute to them [4].

Other trouble is that cryptocurrencies experience surges in interest and also in price and are vulnerable to experiencing intervals of bubble-like price behavior. Phillips and Gorse confirmed mid-term positive relationships between online factors and price strengthen significantly during bubble-like regimes of the price series and found out that short-term relationships between the chosen factors and price appear to be caused by particular market events (such as hacks / security breaches) and are not consistent from one time interval to another in the effect of the factor [9].

Interesting meta-analysis across many disciplines: technical fields, economics, law, public policy, finance, accounting, and others have been done by Holub and Johnson – providing an review of the current state of the body of literature categorizing 13,507 results and 1,206 papers on Bitcoin across six disciplines [6].

As other network-related technologies, also cryptocurrencies seem to follow Metcalfe's Law, as has been shown for some online social media networks. The Bitcoin, Ethereum, and Dash networks were investigated, proving that value grew in proportion to the square of the number of its nodes, or end users (here number of unique addresses each day that engage in transactions on the network used as proxy). Alabi [1] also determined critical mass and potential for spotting value bubbles that can be identified as deviations in value from the model. Phillips and Gorse [10] also aimed to predict such bubbles using a hidden Markov model for a number of cryptocurrencies.

Generally, implementation of cryptocurrencies can hit a number of barriers. Until today, the cryptocurrency has not surpassed the stage of being just a trendy geek tool, not widely used by general public. Similar psychological aspects and barriers be identified also in other new technology industries [12] and their solution can be addressed through CATWOE analysis [16].

Piotrowska and Piotrowski [11] investigate the main weaknesses limiting the functioning of the bitcoin system, and its use in payments in particular in a survey conducted among Polish bitcoin users. They identified these threats: the speculative nature of bitcoin, the lack of adequate awareness in society which would allow for a widespread use of the innovation, potentially too strict regulation of the cryptocurrencies market or its banning.

Piotrowska and Piotrowski [11] also presented threats to the functioning of the system which, in their opinion, are of biggest importance at the moment: the existence of intermediaries, the lack of systemic incentives addressed to bitcoin merchants, growing costs and payment processing time.

Shehhi [13] investigated factors behind choosing a cryptocurrency, which is to some extent similar to our research, but our sample is much bigger and our analysis includes also personal traits and we have used multivariate and not bivariate testing.

However, there is a lack of literature focused on users of cryptocurrencies, especially on their psychological profile or personality traits – and that is, what our paper aims to deal with.

### 3 Data and Methodology

With regards to data, they were collected using a web-based questionnaire in the period from December 2017 to March 2018. Respondents were university students from the Czech Republic, 478 in total (272 male, 206 female; 20.5 years old on average), of whom 62 respondents indicated that they use cryptocurrencies. With regards to their experience from practice, 12 have a full time within the field of study, 16 have a full time outside the field of study, 164 have a part-time job, 176 have a temporary job (brigade), and 106 only study.

Personality traits were evaluated according to John and Soto's Big Five Inventory-2 [15] using Czech translation by Hřebíčková et al. [7]. For this conference paper, only BFI-2-XS [14], i.e. a 15-item version of the instrument was used. The instrument uses a 1-5 Likert scale where 1 stands for strongly disagree and 5 stands for strongly agree.

The explanatory variable was obtained using the question "Do you use the following services? Cryptocurrency (Bitcoin, ...)" Possible answers were:

- No (coded as 0),
- Yes, sometimes (coded as 1),
- Yes, often (coded as 1).

Also additional questions were included in the questionnaire but they have not been analysed in this paper.

Binomial logistic regression will be used to test influence of gender, age, job type and five personality traits on use of cryptocurrencies. A multivariate approach was used. To be more specific, the ordinal logistic regression procedure in SPSS was used for the calculation because of its front-end that allows to enter also factors (discrete independent variables, such gender and job type), not only covariates (continuous independent variables) like the binomial logistic regression procedure in SPSS.

### 4 Results

The research question is if/what five personality traits influence propensity to use cryptocurrencies, while controlling for age, gender, and job type. Ordinal logistic regression estimates for the full model are in Table 1. The model per se is significant,  $p$ -value  $< .001$ , Cox and Snell pseudo  $R^2$  is .073, Nagelkerke pseudo  $R^2$  is .136, and McFadden pseudo  $R^2$  is .099.

**Table 1.** Ordinal regression for the full model.

	Estimate	Std. Error	Wald	df	Sig.
Cryptocurrency use = 0	2.035	1.953	1.086	1	.297
Extraversion	.283	.192	2.166	1	.141
Agreeableness	-.205	.200	1.048	1	.306
Conscientiousness	-.259	.222	1.371	1	.242

Neuroticism	.068	.166	.171	1	.680
Openness to experience	.426	.197	4.704	1	.030
Age	-.029	.059	.239	1	.625
Job type = part-time job	-1.047	.654	2.567	1	.109
Job type = only study	-1.402	.707	3.934	1	.047
Job type = temporary job	-1.469	.670	4.810	1	.028
Job type = full time outside the field of study	-1.247	.910	1.878	1	.171
Job type = full time within the field of study	0 <sup>a</sup>	.	.	0	.
Gender = male	1.286	.359	12.799	1	.000
Gender = female	0 <sup>a</sup>	.	.	0	.

Legend: a. This parameter is set to zero because it is redundant.

Considering all variables, openness to experience, job type, and gender are significant at .05 level. Ordinal logistic regression estimates for the streamlined model are in Table 2.

**Table 2.** Ordinal logistic regression estimates for the streamlined model.

	Estimate	Std. Error	Wald	df	Sig.
Cryptocurrency use = 0	3.036	1.002	9.177	1	.002
Openness to experience	.451	.192	5.541	1	.019
Job type = part-time job	-1.144	.648	3.117	1	.077
Job type = only study	-1.457	.685	4.524	1	.033
Job type = temporary job	-1.591	.663	5.761	1	.016
Job type = full time outside the field of study	-1.267	.892	2.016	1	.156
Job type = full time within the field of study	0 <sup>a</sup>	.	.	0	.
Gender = male	1.300	.343	14.408	1	.000
Gender = female	0 <sup>a</sup>	.	.	0	.

Legend: a. This parameter is set to zero because it is redundant.

The streamlined model per se is significant,  $p$ -value < .001, Cox and Snell pseudo  $R^2$  is .063, Nagelkerke pseudo  $R^2$  is .118, and McFadden pseudo  $R^2$  is .085. Openness to experience positively influences propensity to use cryptocurrencies, so does being a man, and having a full time job within the field of study.

## 5 Conclusions

The goal of this conference paper was to analyze influence of personality traits and demographics on usage of cryptocurrencies. This new technology has so far not been

explored in terms of user motivation and we have (rightly) considered that personality traits and demographics could be a very interesting explanatory variable.

With regards to the results, openness to experience, gender, and job type impact the use. Openness to experience has a positive influence, being male has a positive influence and having a full-time job within the field of study has a positive influence.

It makes sense that people who are more open to new things would use cryptocurrencies more. As a new technology, it is clearly interesting for “early adopters”, since it demonstrates their open mind and technological skills. Cryptocurrencies are following the same path towards mass adoption as other technologies (mobile phones, social media, internet), which have been also firstly adopted by geeks.

When it comes to technology use, in majority studies where gender is significant, it is men adopting it more, which confirm also our results. And the last finding can be interpreted as people with more money adopt cryptocurrencies more. Easy explanation can be, that cryptocurrencies are considered by many as interesting (though due to high volatility quite risky) investment tool, so people with regular income could be more interested in them.

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## Utilization of Social Media Network in Automotive Industry in the Czech Republic: case-study

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**Abstract.** The paper deals with social networks, which have become natural part of our everyday lives; they significantly affect professional and private spheres for their influence and impact is still growing. The industries realize the power of that marketing tool and are developing new strategies and investing into the trendy and widely utilized social networks. The goal of the article is to present three producers and main players in the automobile industry in the field of personal cars in the Czech Republic in the connection with use of social networks. The sub-goal is to present how companies decide on the use of the optimal mix of platforms. Classification of social networks, social media and their purposes are solved and briefly described at the first theoretical part. Three main producers of personal cars and analysis of social networks that are used by producers in automobile industry in the Czech Republic are presented in the main part of the article. It is also analyzed whether producers of cars have direct links from web pages on the selected social networks. The last part is dedicated to selected social networks and how these interactive media are used and might be used by car makers and sellers of cars produced in the Czech Republic. It was found out that the most often used social networks by producers of personal cars are Facebook, YouTube, Twitter and Instagram. Not all the companies discussed in this paper put links on the used social networks.

**Keywords:** Automotive industry, Communication, Information, Social network Management, Use.

### 1 Introduction

Last year 2017 was exceptionally successful in the production of road vehicles in the Czech Republic and the same applies to the entire Czech automotive industry, including the subcontracting sector. These favorable results of the automotive industry are influenced by the positive development of the European and world economy and the growing consumer demand for vehicles in the Czech Republic as well as in Europe. The car industry plays substantial role in the Czech economy, last year in 2017, it

represented even essential part of the Czech economy due to its dynamic growth which was about 4.5% according to analysts. But 2017 is considered to be the top of the current economic cycle. It can be expected that this year, the growth rate of the Czech economy will weaken by about one percentage point, and we are expecting a slowdown in Europe and other markets as well. As for the Czech Republic, influencing factors causing pressure on the decline in the growth rate in 2018 there will be mainly the tensions in the labor market, where the Czech economy will face the limits of its production possibilities, and already mentioned supply reduction of the labor market. It can be expected that a number of automotive companies will also be significantly affected.

The dynamics of the Czech automobile industry will be high even this year but the growth of the production of motor vehicles by more than 5%, as it was in 2017, cannot be expected. Car manufacturers in the Czech Republic produced a total of 1,413,888 vehicles. The production of passenger cars thus again constituted the dominating part of the volume of manufactured motor vehicles. The biggest share of the total production in the Czech Republic was held by ŠKODA AUTO with 60.7%, the second place kept HYUNDAI with 25.2% and the third was TPCA with 14.1%. Production grew year-on-year by 5.2%. It was the best year in history of ŠKODA AUTO; they increased production by more than 12.2% (to astonishing record 858,103, which is almost 93,000 more than last year), HYUNDAI kept production at the level of the previous record year, with a year-on-year decline by 0.5 % reaching a total of 356,700 produced cars. TPCA in Kolín, whose production grew in 2016 and at the beginning of 2017, recorded a year-on-year decline by -9.8%, a total of manufactured cars was 199,078.

The graph in fig. 1 brings comparison of the yearly production of key car manufacturers which are discussed in the paper since the start of new millennium. The graph clearly illustrates the dominating position of ŠKODA Auto producer. In 2005 TPCA opened their production in Kolín. Yearly production isn't balanced its production history follows a wave line, see red bar. In 2008, HUNDAI unobtrusively entered on the car automotive scene in our country and was systematically and distinctively increasing their production until last year [1].

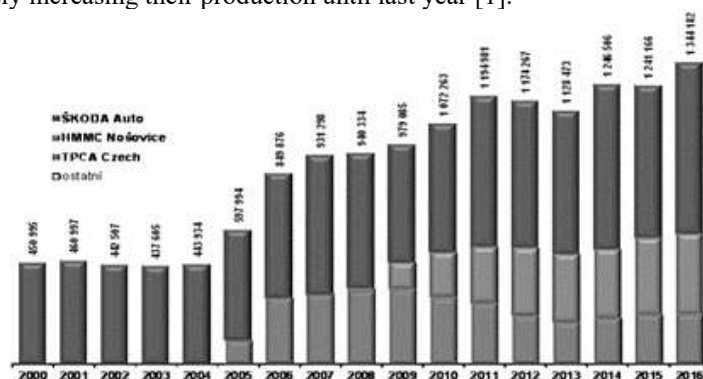


Fig. 1. Producers of personal cars in the Czech Republic [1].



Measuring and evaluation of company performance is carried out in companies through accountancy and other software. The goal of producers, including producers of personal cars is selling as many products as possible. The other vitally important and constant effort is an increase in efficiency and profitability which is interconnected with the main mission. Communication plays an irreplaceable role, in this point we mean communication with both current and new ones. At present time, a trendy and widely utilized channel of communication is the web offering a wide scale of social networks. Out of their undisputable beneficial features we can name: the opportunity to reach an “unlimited number” of people without time lag or the opportunity to update information when needed. Social networks do not serve only for private purposes, any more, their power has been found and is being developed in commercial sphere. The impact of the social media as a whole has an impact on the society. New forms of communication change the communication itself, online communication makes communication faster and sometimes more condensed or just the opposite more superficial, depending which platform is being used and for which purposes. Here the question that is relevant to the analyzed topic arises, whether the companies that produce personal cars in the Czech Republic use selected social networks for communication with their customers, potential customers, with wide audience. Businesses and individuals that would like to buy a new car take into consideration lot of criteria. Communication with a car producer via social nets, visualization a presentation of the car in the video channel, reading on-line forums, watching Instagram, etc. those are currently significantly influencing tools in the purchase of the car.

The organization of the paper is as follows. Firstly theoretical background to the issue is given. The core part of the paper discusses the evaluation of use of social networks by producers of personal cars. The paper contributes to the exploration of utilization of Web 2.0 phenomenon and social networks by companies and individuals in automotive industry. The area of research encompasses producers of personal cars and communication via social networks. These two parts are interconnected because companies and individuals are searching how to save money in all areas of doing business, earn more money, have a larger share on the market and other goals. Social media are very often perceived as the possibility how to save money in the communication with customers and how to gain and keep their interest. Contrary, people like to use social networks that are nowadays modern, popular and easily accessible.

## **2 Literature Review**

### **2.1 Web 1.0, Web 2.0, Web 3.0**

At its beginnings, the Internet was mostly used passively by users. It was called “Read only web” by Berners-Lee.

The most frequently cited name that is connected with the description and definition of Web 2.0 concept is Tim O'Reilly in 2004. He defined the main differences between classical Web site and a new generation web. In terms of software development Web 2.0 is characterized as a shift from centralized processing and services to

decentralization. Second generation web gave users the ability to handle their website and use social networks to converge with other users and attract potential [2]. Cormode and Krishnamurthy brought in 2008 interesting comparison of two stages in the development of the Internet. With the advent of the term Web 2.0, the internet has become interesting not only for personal but also for commercial use. Web 2.0 allows the user to create content, communicate with users online, and the pages are more sophisticated and clear than those of the classic Web site. The term "social media" is linked to the use of the term Web 2.0. Social media is the very place where a user can create content. Social media can be divided on the basis of their main mission and marketing tactics. Social media are social media networks. [3]

Pros and contras of Web 2.0 are described in the article "Best of the web and best of the web-Criticism" which brings an insight into the Web 2.0 platform which enabled user-generated content, and focuses on usability of the web, its ease of use by wide audience not only by experts, and interoperability. [4] All these characteristics play an important role in the social networks which are discussed in this paper, because the optimal utilization can significantly increase the performance of companies.

As for the 3rd stage in the Internet development platforms, Web 3.0 was described as the extension of Web 2.0. Connective intelligence is its main characteristics encompassing connecting data, concepts, applications and ultimately people. Web 3.0. is also called Semantic Web, see more [5], [6].

## **2.2 Social Networks**

A sociologist J. A. Barnes (1954) is considered to be the author of the definition of the social network. The term social network is associated with the Internet and directly with the social networks on the Internet. But this is not the only connection there is a need to deal with the concept of social network from the sociological point of view, therefore, the social network can be described as a "map of the area near and distant surroundings where relationships of involved people are defined." [7]

Černá, Svobodová [8] presented in previous research the most often used social networks Facebook, Instagram and Twitter or Svobodová [9] use of YouTube.

Social networks have global popularity. One of the most common online activities in the EU-28 in 2017 was participation in social networking. More than half (54 %) of individuals aged 16 to 74 used the internet for social networking, for example using sites such as Facebook or Twitter in the EU [10]. According to Czech statistical office [11] 48.3% of individuals aged 16-74 use social networks in the Czech Republic.

## **2.3 Social Media**

Social media are applications which become social networks via users' use.

Social media are a form of electronic communication (social networking and microblogging networks), through which users create online communities to share information, ideas, personal messages and other content (videos). [12] Social media can be divided on the basis to marketing tactics as Social networks (Facebook, MySpace, LinkedIn); Blogs, video blogs, microblogs (Twitter); Discussion forums, Q & A portals

(Yahoo Answers); Wikis (Wikipedia, Google Knol); Bookmarking systems (Digg, Delicious, Jagg); Shared multimedia (YouTube, Flickr); Virtual worlds (Second Life, The Sims). [13]

How Brand Actions and User Actions Influence Brand Value by use of social networks is solved in [14] and performance measurement system to quantify the contribution of social media is presented in [15]. Du and Jiang [16] find that company use of social media is associated with firm performance, measured by stock price and return on assets. When testing the individual association of the various platforms and firm performance, the authors find that only Facebook and Twitter has a statistically significant relationship. They observe that half of the firms use one or both of these platforms.

## **2.4 The Main Purposes of Selected Social Networks**

The subchapter contains theoretical background of purposes of selected social networks.

- Facebook – Facebook for marketing allows businesses, organizations and public figures to connect with customers, fans and constituents through the website. Businesses and other brands create pages where they can post content, provide organizational news, offer deals, introduce products and manage customer service relationships. They also can reach a large number of people with targeted advertising, creating ads specifically for Facebook that are tailored to appear on the pages of specific groups of people they hope to reach. [17]
- YouTube - companies might gain a lot from short videos on YouTube showing the benefits of their products and also videos how to use products. YouTube is all about getting visitors to stay and consume video after video so that they can see ad after ad. According to one small study, conducted by Phil Nottingham of Distilled, only 0.72% of viewers of YouTube channels with URL's in the description clicked thru to the linked site. What that tells us is, if you are trying to get people to come to your website, YouTube might not be the tool to click thru to the linked site. [18]
- Twitter - it is a social networking and microblog provider that allows users to send and read posts sent by other users, known as tweets. The main purpose of Twitter is to make profits for those running the business (founders, investors, employees and more). From a user's perspective, it may serve many purposes including but not limited to: Keep an eye on trending events/news, Connect with like-minded people, Marketing or promotion of business, Stalk and spam, Vent out emotions or anger, Business Support, Finding and connecting with influencers. [19]
- Google+ - the purpose of Google plus is to provide a binder to the web experience of a user. It is one of the top components of Google ecosystem now solving a multitude of problems not only for google but for the whole web. It also helps provide a web identity to users. [20] Glusman presented [21] 7 Reasons Why You Should Be Using Google+ For Your Business.
- LinkedIn - it is a professional social network where professionals meet and discuss their work interests and they are also looking for new employees. LinkedIn is a

professional social media network, where users create profiles highlighting current and prior work experience. You can upload resumes, connect with colleagues and classmates and build a network that can help you advance in your career. [22]

- Instagram - the app allows users to upload photos and videos to the service, which can be edited with various filters, and organized with tags and location information. An account's posts can be shared publicly or with pre-approved followers. Users can browse other users' content by tags and locations, and view trending content. Users can "like" photos and follow other users to add their content to a feed. [23]

### **3 Methodology and Goal**

*The goal of the article is to present three producers and main players in the automotive industry in the field of personal cars in the Czech Republic in the connection with use of social networks. The sub-goal is to present how companies decides on the use of the optimal mix of platforms.*

The article is based on primary and secondary sources. The secondary sources provide information about automotive industry in the Czech Republic, Web 1.0, 2.0 and 3.0, social media and networks, professional literature, information collected from professional press, web sites, discussions and previous participation at professional seminars and conferences related to the chosen subject. It was then necessary to select, classify and update accessible relevant information from the numerous published materials that provide the basic knowledge about the selected topic.

The main part of the article is based on the available resources of the most often used social networks and producers of personal cars in the Czech Republic. The last part is devoted to optimal use of platforms by companies producing personal cars in automotive industry.

### **4 Results**

The results part at first contains the results of investigation that is focused on the use of social networks by automotive producers and by trademarks of personal cars that are produced in the Czech Republic. The second part contains information about social network Facebook, YouTube, Twitter, Instagram, Google+, LinkedIn and their use by producer of personal cars in automotive industry in the Czech Republic. Next topic is focused on the interconnection of social networks with web pages of selected companies.

#### **4.1 Car Manufacturers**

On the basis of gained results from the investigation a selection of the below discussed results have been made.

Three major manufacturing companies (Škoda Auto, TPCA Czech and Hyundai) were selected first and then the brands of specific carmakers in the Czech Republic were searched for. TPCA Czech brands are Toyota, Peugeot and Citroen.

## 4.2 Producers of Cars, Web Pages and Social Networks

In the next part of the research there were analysed social networks Facebook, Twitter, Instagram, YouTube, Google+ and LinkedIn in the connection with producers of personal cars in the Czech Republic. It was searched whether or not have the producers of cars account on the widely used social network Facebook or on others. Accounts of the individual brands were searched on the all mentioned social networks. Results are presented in table 1.

**Table 1.** Use of social networks and direct links between producers of personal cars www and social networks [24-35].

	Facebook		YouTube		Twitter		Google+		LinkedIn		Instagram	
	Use	Link	Use	Link	Use	Link	Use	Link	Use	Link	Use	Link
Škoda Auto	x	x	x	x	x	x	x	-	x	-	x	x
HMMC Nošovice	x	x	x	x	-	-	x	-	x	x	x	x
TPCA Czech	x	x	x	x	x	-	-	-	x	x	x	x

The data were distributed to car manufacturers and subsequently to brands that are produced in the Czech Republic in the field of passenger cars. All manufacturers and brands of cars use social networks as Facebook, YouTube and Instagram and have links to the first page of their websites. This is not the case for manufacturers. Peugeot, Citroen and Toyota have links on Google+ only in English. The pages in foreign languages, esp. English, are important because they make up the most important part of the sale. In the Czech Republic producers sell only small part of produced cars. The smallest connectivity between websites and social networks is on Google+ and LinkedIn.

**Table 2.** Use of social networks and direct links between trademarks of personal cars produced in the Czech Republic www and social networks [24-35].

	Facebook		YouTube		Twitter		Google+		LinkedIn		Instagram	
	Use	Link	Use	Link	Use	Link	Use	Link	Use	Link	Use	Link
Škoda Auto	x	x	x	x	x	x	x	-	x	-	x	x
Hyundai	x	x	x	x	x	x	-	-	x	-	x	x
Peugeot	x	x	x	x	x	x	x	-	x	-	x	x
Citroen	x	x	x	x	x	x	x	-	x	x	x	x
Toyota	x	x	x	x	x	-	x	x	x	x	x	x

### 4.3 Optimal Use of Platforms by Companies in Automotive Industry

Recommended optimal Social Media Network portfolio for companies in automotive industry and sellers of cars in the Czech Republic is use of selected social networks. They were selected due functions that they provide and also they are widely used by citizens and companies.

A decision tree was designed after elaboration of assessment and analyses of individual social applications. It had been inspired by the mind map since its processing is looser and doesn't fully respect all the principles and the range is less than normal.

The main element can be described as a decision node (What do you want to share?), which gets divided into individual branches - into solution suggestions (Twitter....) according to the response (Short text ...).

In case of multiple response, these suggestions converge back to one branch, which is unusual for the decision tree. The inspiration by mind map can be seen in that.

A variant of the decision tree, which is simplified by adapting of some habits from mind maps, has been chosen because there is no conventional diagram for such a small scale and convergence in the event that we need something from everything. For this reason, it is preferable to use the decision tree.

The draw.io website [37] was used to create the decision tree (see fig. 2).

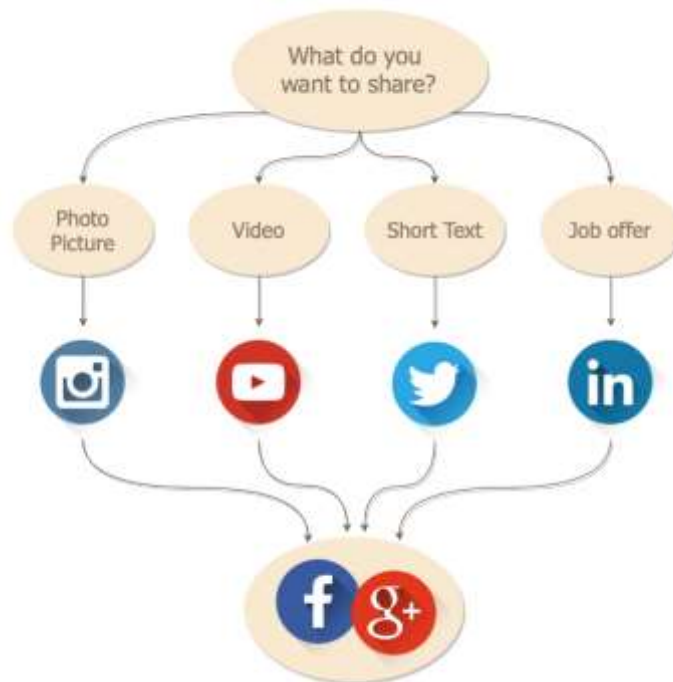








Fig. 2. Decision tree – use of social networks.

Recommendations based on the analysis and findings:

-  Facebook – fits for posting content, informing on organizational news, presenting offer deals, introduction of products and managing customer service relationships. It can be used periodically but *mostly when something is new in the area*. The official website could be connected to fan pages of car sympathizers.
-  YouTube – its main mission is sharing video. For the purposes of automobile industry it is used for presentation of new cars and their specifications but also as cars within a frame of wider concepts, e.g. cars in smart cities.
-  Google+ - is the social network that offers wide variety of tools and functionalities. It is recommended to use a user profile as a publicly visible account of a user that is connected to many Google properties. Circles enable users to organize people into groups or lists for sharing across various Google products and services. Companies can use also Stream, Identity service, +1 Button, Google+ pages, Communities, Events, Discover, Photography etc. This social net offers the alternative features to Facebook. It also enables connection between official pages or profile of the car company with the unofficial fan pages.
-  Twitter – enables short reports on latest news and launching new products. It can be used in case when the instant statement of producers on eventual affairs is needed.
-  LinkedIn – is predominantly used by companies in the staffing issue, so companies in the automobile industry should use this proven media for seeking of new employees.
-  Instagram – perfectly fits for posting of photo or video from the business environment as well as from the car followers

Companies may use also WhatsApp, Viber, Blogs and other social networks if necessary. Important is to connect social networks with the www pages of companies. The links should be placed clearly on the first page and then if necessary according to the individual topics.

## 5 Discussion and Conclusion

The intention of the article is to stimulate a conversation and proposes ways in which to frame early and future research. Social networks fit knowledge management as they open the door to new ways of communication, enable development, editing, sharing and storing materials on the virtual platform. Social networks are nowadays one of the most popular and most often used channels to inform and communicate not only in the private sphere but also at business environment.

The goal of the article was to present the most often used social networks by producers of personal cars and trademarks that are produced in the Czech Republic and links between web pages and social networks in the Czech Republic. Another goal was to create a decision tree and prepare a set of recommendations on utilization of individual social networks based on the analysis and findings.

In the Czech Republic, social media are more often used by individual brands than by car production plants. The least used social net by producers is Google+. The social network is not being used and it is expected that it will soon disappear due to security problems. This may be also the reason to lower activity on a given social network. HMMC Nošovice doesn't use Twitter. Google+ isn't used by TPCA Czech but on the other hand ŠKODA AUTO uses Google+ but doesn't have the link to this network from their website. Another thing that misses in the management of media in ŠKODA AUTO is the linking of company websites with the LinkedIn where new employees are searched for.

When it comes to the use of social networks by individual car dealers of cars that are produced in the Czech Republic, they all have links from their websites to Facebook, YouTube and Instagram. As for Toyota, a link to Twitter from their website is missing. As already mentioned, Google+ doesn't rank among the favourite social nets because most of missing links from websites concern Google+. An interesting fact is that information that is presented on Google+ is mostly in English even on Czech websites. All companies use LinkedIn services, but only Citroen and Toyota have a link to that net on their home page.

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## Use of Web 2.0 and Social Networks by Regional Cities in the Czech Republic and in Poland

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**Abstract.** The aim of the undertaken research is a comparative analysis of the use of websites and Facebook in communication activities of regional cities in the Czech Republic and Poland. Just as the popularity of social networks is growing, their use by the public administration increases as well with the development of information and communication technologies. Citizens and businesses can communicate with the government and local authorities through e-mail, they can browse their websites, where required forms can be found, downloaded or directly filled in and sent electronically or communicate through social networks. The key part brings results from the research that was run at the fourth quarter 2018 at the University of Hradec Králové and at Wrocław University of Economics. Analyzed areas relate to the use of websites and social software applications, specifically Facebook for communication purposes between municipalities and citizens. All analyzed cities have established the official website of the city and have a profile on Facebook. Not all of them have profile on YouTube. Similar usage by regional cities recorded Twitter and Instagram. Pinterest is almost not used. On Facebook are mostly presented photos, videos, culture and social events and sport.

**Keywords:** Communication, Municipality, Social Network, Website.

### 1 Introduction

Marketing of municipalities is a process that influences the spirit and form of the community. It will find its application in such aspects of the life of cities that are connected, both with the offer of material goods and services, as well as with suitable tools for presenting various events in the village. It also acts as a good way to promote ideas, among other things. It makes it possible to find problematic circuits and remove them further. In addition, it gives community representatives the opportunity to build on the positive aspects of a particular municipality. [11]

The use and mission of marketing depends on local government that plays a key role in deciding on the use of marketing tools. This is the area of community development, state administration, services, investment in the municipality, community tourism,

citizens' awareness, etc. Marketing of the municipality can affect many different products from the life sphere of the municipality that it offers. In the independent competence in municipal territorial district, and in accordance with the local conditions and local customs, the municipality also attends to the fostering of conditions for the development of social care and to the satisfaction of the needs of its citizens. This includes, in particular, meeting the needs for housing, the protection and development of health care, transport and communications, information, education and training, general cultural development, and the protection of public order.”

According to the Act no. 106/1999 Coll., on Free Access to Information [24], § 2 in the Czech Republic, the municipality has an obligation to provide information relating to their competence. That is the information that under this Act they are required to disclose and others intended for publishing, e.g. under the law on personal data protection, building act, etc. and in Poland in Act on Access to Public Information (JoL 01.112.1198) [26]. Publishing of information allows to interested citizens in areas related to events, photos, municipal property, municipal budget, strategic plan development, promotion and funding of public goods, what is happening in the municipality, companies engaged in the community, voluntary associations, and other areas. Published and understandable information can improve communication between people and municipality. Citizens can get information what is the municipality and public administration doing. Notice-boards before municipality authorities basically inform about opening hours, present the minutes of the meetings of the municipality authorities, building permits, tenders and other official information. Websites of the larger municipalities also generally contain information and guidance solutions to life situations, links to useful websites, for example Public Administration Portal, the Ministry of Regional Development and the Ministry of the Interior of the Czech Republic and ePUAP (electronic administration platform) or BIP (public information platform) in Poland are as well as important for the citizens of the municipality as well as important for municipalities.

Changes in the global information society affect all areas of communication, of publishing, delivery, display and search. Social networks are now one of the contact point for citizens, effective marketing tool for promotion, PR, direct marketing, openness town halls and others. Information attracts attention, emotions, stimulate debate and encourage people to share it with the help of texts and graphics. Social networks are more and more used for communication between municipalities and citizens. They contain information about current events in the municipality, invitations to cultural, social, sports or other actions. Some municipalities use them for information about the weather, interesting places, to entice tourists, etc. Also for this reason we have focused in the article on the use of the Internet and especially social networks to inform citizens in the Czech and Poland municipalities.

## **2 Methodology and Goal**

Primary and secondary sources were used in the processing of the article. Primary sources were obtained within the survey, which was conducted by teachers and students

at the Faculty of Informatics and Management on the University of Hradec Králové and at the Wrocław University of Economics. The investigation was done in October 2018. A teams of selected students and teachers were searching in selected social networks for communities which were created to meet the needs of municipalities and theirs citizens. Researches focused on the presented information about municipalities on several social networks. Results of utilization of the most often use social network Facebook by regional cities in both countries will be presented in the article. In the Czech Republic is 12 regional cities plus capital city Prague. In Poland is 17 regional cities plus capital city Warsaw.

Section 4 § 1 of the Municipalities Act [25] states 25 statutory towns and 12 regional cities in the Czech Republic and 17 regional cities in Poland are stated by [27] from which the survey, reflect. Therefore, the results will be referenced to a given sample of respondents (regional cities).

As for the primary sources they comprised websites and social networks of selected cities. Secondary sources comprised from official statistics from Eurostat [8, 9], Statista [16, 17] or statcounter [18, 19], technical literature, information gathered from professional journals, discussions or participation at professional seminars or conferences. Then it was necessary to select, categorize and update available relevant information from the collected published material.

The main objective will be mapping and analyzing of the use of social networks by regional cities in the Czech Republic and in Poland. The main objective will be achieved by analyzing the current state of use of the websites and social networks of individual regional cities. In order to achieve the main objective, it will be necessary to analyze electronic communication of cities with their citizens. The sub-goal is to determine the types of social networks that use the largest cities of the Czech Republic and Poland and to identify the activity of towns on the Facebook social network.

The quantitative research was used to analyze the use of social networks Facebook, YouTube, Instagram, Twitter and Pinterest. The advantage of that is in particular the rapid data collection and evaluation of results. We will also use the methodology of observation, description and measurement of data. MS Office Excel was used for the collected data that were needed to analyze the situation of the use of social network's by the regional municipalities. Data were for better clarity processed into individual graphs presented in the article.

### **3 Literature Review**

In the next part will be defined regional city in the Czech Republic and in Poland, web 2.0 and social networks and use of social networks in EU-28, in the Czech Republic and in Poland.

#### **3.1 Municipality and Regional Cities**

According to Act No. 128/2000 Coll., on municipalities [26] in the Czech Republic as amended, the municipality is the basic territorial self-governing community of citizens

and forms a territorial unit that is defined by the boundary of the territory of the municipality. Municipality has the right to decide independently in matters of public administration given that the municipality is a territorial community of citizens. The Freedom of Information Act imposes on municipalities the obligation to have websites created on which basic information is at least published in the Czech Republic. The basic information that is published also includes the annual report for the previous calendar year about its activity in the field of information provision "(Section 5, paragraph 1, No. 106/1999 Coll., On Free Access to Information, as amended [24]).

In Poland by the Law dated 8 March 1990 a territorial self-government as a basic organizational form of the local society was reactivated. A city with county status, fulfills responsibilities ensuing from the Act of Gmina Self-Government dated 8 March 1999 (JoL 2001.142.1591 with later amendments) and the Act of Powiat Self-Government regarding all basics tasks concerning local affairs. [27] There is obligation to create BIP (public information webpage) for each municipality in Poland (Art.8.1 Act on Access to Public Information (JoL 01.112.1198) [25]).

### **3.2 Web 2.0 and Social Networks**

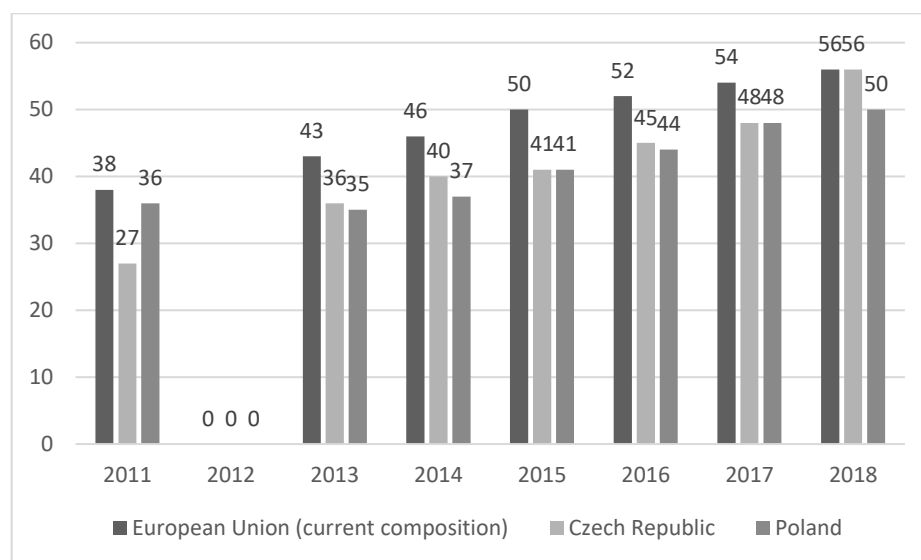
Clearly, the modern, most widespread and flexible communication tool is the site of a community that is somewhat low-cost. Websites allow direct information transfer, community image building, relationships, and advertising. The main functions of the municipalities' websites are the informative function (source of validated and up-to-date information concerning the administration of the municipality, events in the municipality, the running of the municipal office, etc.), interaction (on-line service in the form of electronic forms, clerks) and presentation (representation outside of the community).

Worldwide, in October 2018 was the global digital population, especially active internet users 4 176 (in millions) and 3 397 were active social media users. (Statista1)

Most famous social network sites worldwide as of October 2018, ranked by number of active users (in millions) are Facebook with 2 234, YouTube 1 900, WhatsApp 1 500, Facebook Messenger 1 300, WeChat 1 058, Instagram 1 000, ... Twitter 335 ... and Pinterest 250 [16]. It is clear from the data that social networks are very popular. This boom plays a very important role not only in the marketing of municipalities, as through social networks we can reach a large circle of potential citizens, tourists and customers in a very short time and with little money. Society in the Czech Republic is also good technological equipped. [20] Situation in Poland is on the similar level.

Social networks have global popularity. One of the most common online activities in the EU-28 in 2017 was participation in social networks. All statistics from Eurostat are % of individuals aged 16 to 74. Data refer to the last 3 months before the survey, for private purposes. Data for year 2012 are not in Eurostat presented. More than half (56%) of individuals aged 16-74 used the internet for social networks such as Facebook or Twitter. 91% of individuals aged 16-74 use social networks in Iceland, 82% in Norway, 79% in Denmark, 73% in Belgium and 70% in Sweden a United Kingdom. At the opposite end of the scale, there are three EU Member States with a maximum of 42%. The last is France with 42%, Italy with 46% and Slovenia with 49%. 50% has

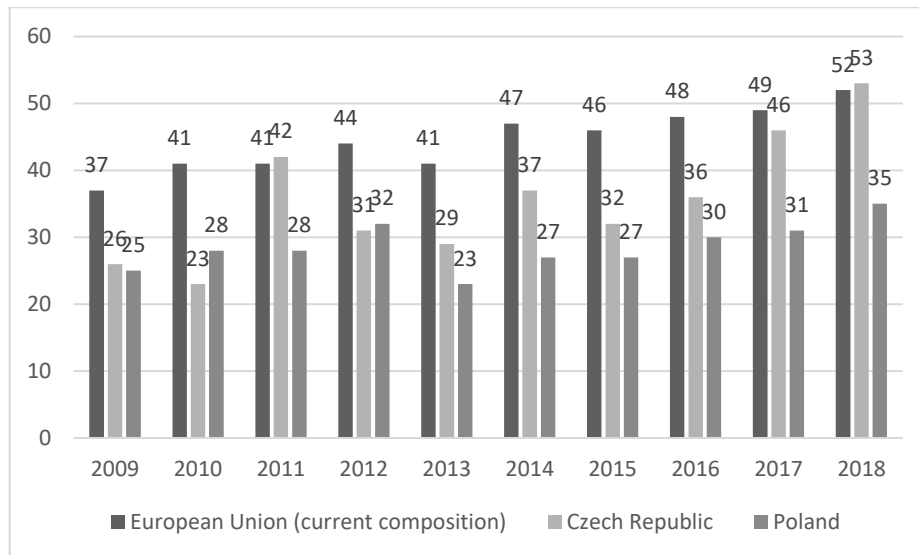
Poland and 51% Bulgaria. [8] Social networks were used mostly in EU-28 in all monitored years than in the Czech Republic or Poland. In both countries and in EU-28 was use of participating in social networks rising. The biggest rise was recorded in the Czech Republic in 2018 according to 2017. Instead of the last monitored year was usage of social networks in the Czech Republic and in Poland on the similar level.



**Fig. 1.** Internet use: participating in social networks (creating user profile, posting messages or other contributions to Facebook, Twitter, etc.) from 2011 till 2018 in EU, Czech Republic and Poland, in % [8].

In November 2018 use Facebook 60.11%, YouTube 12.97%, Pinterest 12.39%, Twitter 4.82%, Tumblr 4.49% and Instagram with 2.18% in Poland. In the Czech Republic is a little bit other situation. 70.36% of individuals use Facebook, 12.86% use Pinterest, 5.86% YouTube, 4.78% Twitter, 2.04% Tumblr and 1.27% Instagram. [18, 19]

If we focus on Internet use obtaining information from public authority websites, it is clear that the EU average (28 countries) was higher than the EU average (28 countries) over all monitored periods in the Czech Republic and Poland. The breakthrough occurred in the last monitored year, when the information received from public authorities in the Czech Republic increased significantly and, on the contrary, slightly decreased in the EU28. None of the monitored areas showed steady growth, but rather a fluctuating trend. The information obtained from public authorities in Poland was very different. This was only twice higher than the Czech Republic in 2008 and 2010. The biggest differences between the Czech Republic and Poland were recorded in 2014, 2017 and 2018. [9]



**Fig. 2.** Internet use: obtaining information from public authorities websites (last 12 months) from 2008 till 2018 in EU, Czech Republic and Poland, in % [9].

### 3.3 Social Networks and Municipalities

Social media are a helpful force in the construction of internet public sphere and civil society. [7] Over the last few years, online social networks (OSNs), such as Facebook, Twitter and Tuenti, have experienced exponential growth in both profile registrations and social interactions. These networks allow people to share different information ranging from news, photos, videos, feelings, personal information or research activities. [1] Lappas, Triantafilidou et. al. [14] analyze the communication strategies used by Greek local governments through the utilization of Web 2.0 technologies, specifically Facebook, and the effectiveness of these strategies in relation to citizens' online engagement. Their results show that local governments in Greece are using Facebook in a predominantly top-down manner to promote events organized by the municipality and to push one-way information to citizens about their services and actions. Local authorities have, however, made significant progress in relation to posts that support transparency and accountability and that enhance or mobilize citizens' participation. Their evaluation of local government Facebook strategies indicates that marketing the municipality to external public, such as tourists, and providing information about services are effective strategies that drive citizens' online attitude expression (liking), engagement (commenting), and advocacy behavior (sharing). The obtained results by Haro-de-Rosario, Saez-Martin and del Carmen Caba-Perez [12] show that Facebook is preferred to Twitter as a means of participating in local government issues. Other factors that are relevant to citizen engagement are the level of online transparency, mood, the level of activity in social media and the interactivity offered by the local government website. Findings of Lameriras, Silva and Tavares [13]



indicate that in larger and wealthier municipalities local executives are more likely to display increased reliance on Facebook. Facebook post activity is also positively associated with higher transparency levels and mayoral turnover. The purpose of Miranda, Chamorro and Rubio study [15] is to analyse the presence on and use of the social network Facebook by the large councils in the USA, UK and Spain. This research adapts Facebook assessment index (FAI) to the field of local authorities. This index assesses three dimensions: popularity, content and interactivity. The results show that there is no relationship between the population of the municipality and the degree of use of Facebook by the council, but there are notable differences depending on the country. Gesuele [10] suggest that the political position, the gender of the Mayor, the geographical position, the financial autonomy of municipalities, and the citizens' wealth seem to predict the diffusion of Facebook use by Italian municipalities. The objective of the Bonson, Royo, Ratkai article [5] is to provide an initial assessment of Facebook use by Western European municipalities considering two aspects: citizens' engagement and municipalities' activity. Findings show that the use of Facebook by Western European local governments has become commonplace. The audiences of the official Facebook pages are rather high, but citizen engagement in general is low. It seems that channel activity is more a decision on the part of local governments than a consequence of citizen demand. YouTube seems to be according to Bonson and Bednarova [6] an interesting platform to not only disseminate different content, but also to foster local government dialogic communication, as it provides the ability to express citizens' opinions about the particular video through like/dislike buttons and the possibility to post comments on the shared videos. Hence, when this is adopted alongside a relevant online communication strategy, it can significantly foster municipality e-participation. Additionally, considering the added layer of richness of video messages, YouTube might be an ideal avenue for fostering dialogue with citizen.

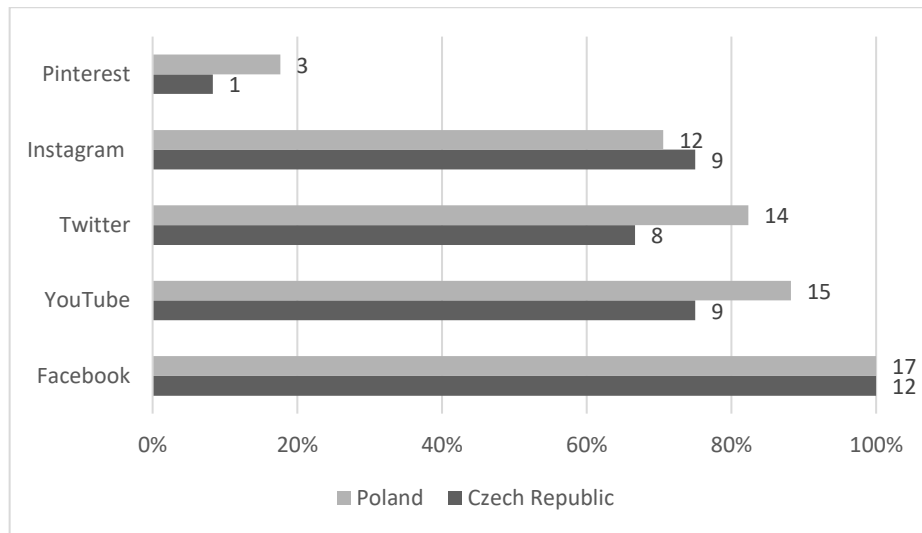
In 2016 Svobodova, Hedvicakova [22] and Svobodova, Dittrichova [23] focused on use of internet and social networks in the connection with municipalities. Svobodová analysed in next research [21] use of social networks and webpages used by regional municipalities in the Czech Republic. Bednarska-Olejniczak and Olejniczak focused on participatory budgeting in the connection with smart city 3.0 concept [2], finance and marketing issues [3] and changes in the attitudes of Y generation members [4].

## 4 Results

Used social networks by regional cities in the Czech Republic and in Poland will be analyzed and compared in the chapter. Into comparison were included the most often used social networks such as Facebook, YouTube, Twitter, Instagram and Pinterest.

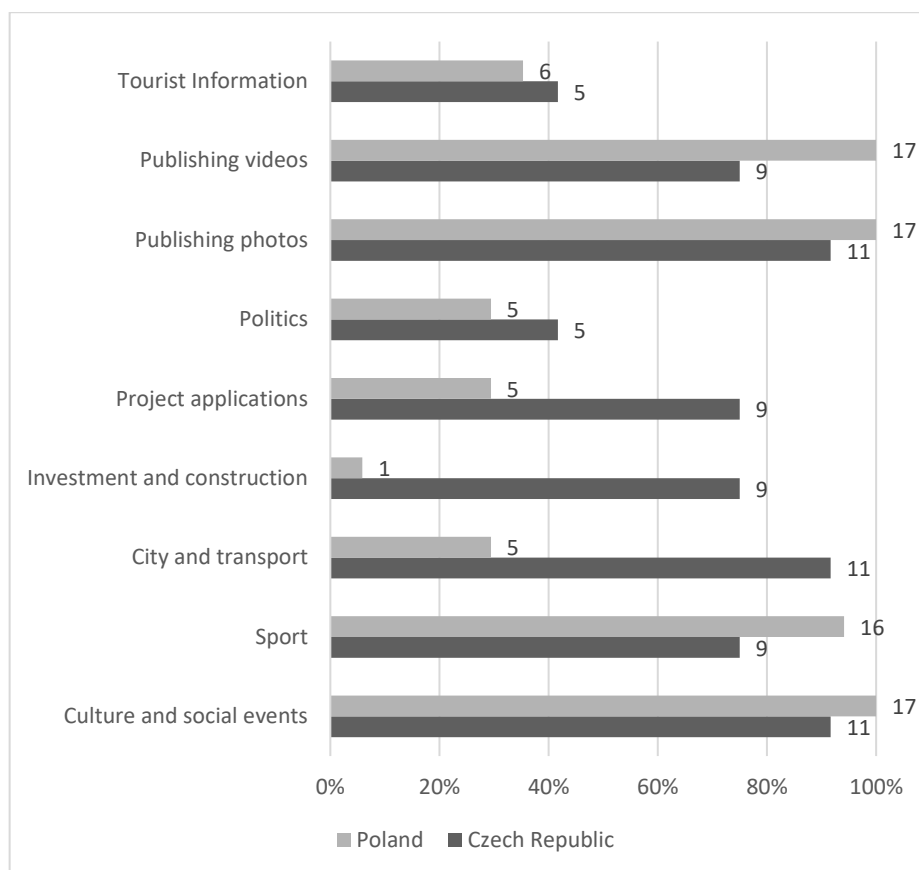
Facebook is used by all analyzed cities in the Czech Republic and in Poland (see fig. 3). YouTube is the second most often used social network in both countries. Twitter is the number three in Poland and four in the Czech Republic. There is no significant difference in usage of YouTube, Twitter and Instagram in the Czech Republic and in Poland. In Poland use regional cities more social networks than in the Czech Republic.

Pinterest is almost not used by regional cities in both countries. Results in the usage are not corresponding to statistics presented above. [18, 19]



**Fig. 3.** Use of social networks by regional cities in 2018 in the Czech Republic and Poland, in %.

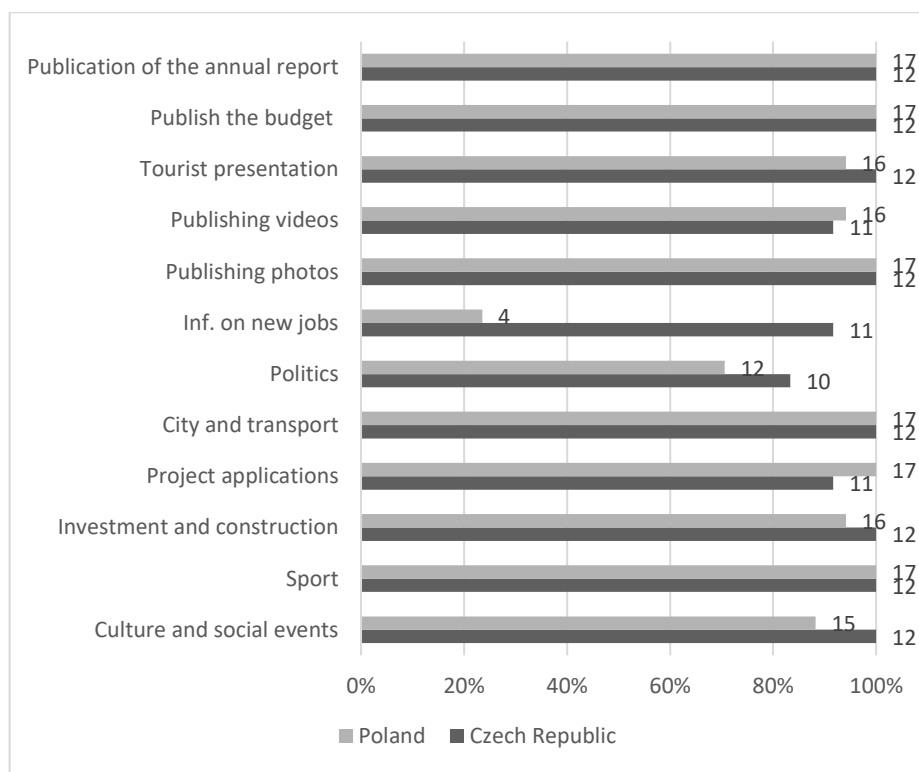
Next question is focused on the topics presented on the Facebook. Into consideration were taken culture, sport, investment, projects and applications, municipality and transportation, policy. All topics are presented in the article (fig. 4). The publication of photos and videos on social networks is a big phenomenon not in the communication between municipalities and citizens but also only between people from their personal life. All regional cities in Poland present culture and social events, publishing videos and photos. All instead one present information about sport. They are not so active in presenting of city and transport, project applications, politics, tourist information and investment and construction. Czech regional cities are mostly presenting culture and social events, city and transport and they are publishing photos. 9 of 12 are publishing videos, information about sport, investment and construction, project applications. The less presented are surprisingly tourist information. In the Czech Republic regional cities on Facebook presents more topics than cities in Poland (in %).



**Fig. 4.** Presented information on social network Facebook by regional cities in 2018 in the Czech Republic and in Poland, in %.

On the websites of regional cities are according to analyzed data presented more information than on Facebook (fig. 5). All cities present information about sport, city and transport, publish the budget and publish the annual report. Almost all instead one present project applications, tourist information and investment and construction. Only one less present culture and social events and publishing videos. The biggest difference is in the publishing of new jobs. In the Czech Republic cities use more cities this channel to looking for the new employee. All other compared issues are on the similar levels of usage.

While there is not enough information on Facebook pages of regional cities in Poland on the City and Transport, Politics, Project Applications and Investment and Construction pages, they more inform about those issues on their websites.



**Fig. 5.** Presented information on websites by regional cities in 2018 in the Czech Republic and in Poland, in %.

## 5 Conclusion and Discussion

An example of where to use marketing tools is the competitiveness of the municipality. The decisive factors of location include the quality of the environment, the possibility of using leisure time, the representation of the village externally, the civic amenities, the possibilities of education and many others. With the growing pressure of local people and economic operators on local governments, there is a growing need for marketing and thinking that leads to a proper and satisfactory solution.

The research and its results presented in the article was done in 2018 at the University of Hradec Králové and at Wrocław University of Economics. The research sample consisted of 12 a 17 regional cities in the Czech Republic and in Poland. The capital cities were excluded. All municipalities use Facebook and all of them use another social web application such as Youtube, Twitter, Instagram or Pinterest. Czech and Poland regional cities has similar results as [12] that show that Facebook is preferred to Twitter as a means of communication. According to results [14] it is possible to recommend to use more Facebook for promoting tourist information that are more presented on the websites than on Facebook. All analysed municipalities

published the most information on Facebook about leisure time, esp. about culture, sports, publishing of photos and videos. Much more information is presented in the clear ways on their websites. All regional cities respect the law [24, 26] to publish the budgets and annual reports on their websites. There are no significant differences in usage of websites instead looking for new jobs between Czech and Poland regional cities. Facebook show bigger differences between both countries.

Even though not all the population in the Czech Republic and in Poland uses the Internet and social applications, it is desirable for the municipalities to have well-designed websites and introduce also social web applications since time cannot be stopped. The question for discussion might be 'how fast and in what direction websites of individual cities will develop'. The next question can be aimed at managers of cities 'how to stimulate them for greater involvement in utilization of these modern ways of communication'. Next planned step in research is according to [15] to analyse Facebook assessment index (FAI).

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## The Level of Bank Customers' Knowledge about Bancassurance Services in Poland

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**Abstract.** The aim of the work is to determine and characterize the level of knowledge of bank customers about bancassurance services in Poland. The basic source of data for analysis and conclusions was primary information from our own research (CAWI, 570 respondents). In order to achieve the set goal, structure indicators and a non-parametric "chi" square test were used. The results of the analysis are presented in a descriptive and graphical form. According to the analysis, the majority of bank customers claimed that they had never met the concept of bancassurance, despite the fact that some of them used a joint offer of banks and insurance companies during the analyzed period. Most often, the term was associated with bank fraud. Only one person in three could correctly explain the meaning of the term. A higher level of knowledge of the term "bancassurance" was characteristic of men, people up to 35 years of age, with secondary education and customers of commercial banks. Almost every second respondent in the discussed period benefited from the purchase of insurance in a bank. The most frequently purchased product was credit insurance. An area of knowledge that requires urgent educational activities is the knowledge of institutions dealing with consumer rights protection in the financial market.

**Keywords:** Bank, Bancassurance, Insurance Awareness.

### 1 Introduction

Insurance awareness is an important element of a well-functioning insurance market. It allows the society to make rational use of the available insurance offer, which provides protection against the risk of adverse random events [5].

Many definitions of the term "insurance awareness" can be found in literature. According to T. Szumlicz [13], insurance awareness is the knowledge and skills enabling the rational use of insurance coverage. It is a derivative of legal, economic and social awareness. A consumer's insurance awareness can also be defined as a mental state in which they are aware of various phenomena concerning insurance occurring on the market and then are able to react appropriately to them [4].

A more comprehensive definition of insurance awareness is provided by A. Szromnik [12], which considers that the level of insurance awareness includes, among others: perception of risks, knowledge of services meeting security needs, knowledge of insurance companies and the products they offer, knowledge of the rights and

obligations of insured persons and the ability to assess the use of services in relation to the needs.

Insurance education plays an important role in shaping and developing insurance awareness. In the European Commission's communication on financial education of 18 December 2007, the main emphasis was put on two principles of education in the field of financial services: the principle of lifelong learning and the principle of appropriate addressing of educational activities to meet specific needs and target groups [2]. Therefore, it is important to conduct research to assess the level of knowledge of different groups of citizens about insurance services, as well as to identify their needs in this area.

The aim of the work is to determine and characterize the level of knowledge of bank customers about bancassurance services in Poland. The results obtained may be a source of information for entities involved in insurance education. Currently, more and more banks and insurance companies include the financial education of citizens in their responsible business strategies.

## 2 Methodology

The basic source of data for analysis and conclusions was primary information from our own research. The research was based on the Computer Assisted Web Interview (CAWI) technique. The questionnaire consisted of two parts. The first part included questions about consumers' knowledge of bancassurance products (8 closed-ended questions), the second part was a certificate (7 questions). The survey was conducted in 2018 on a group of 570 respondents selected deliberately.

Among the persons who participated in the interview, 52% were women and 48% men. Only adults (over 18 years of age) took part in the survey. Nearly 50% of the respondents were persons aged between 18 to 35. The share of respondents aged 36-55 was 40%. The remaining respondents were over 55 years of age. Persons with a higher education constituted almost 50% of the analyzed group. Every fourth respondent had a secondary education. Other survey participants declared a vocational education. The dominant group of respondents were employed persons (69% of respondents). Every tenth respondent was a pensioner. Farmers also took part in the survey (9%). The remaining persons constituted 12% of the respondents (students, unemployed, etc.). 55% of the respondents were city dwellers, 45% lived in rural areas. All the respondents had a bank account. Most of them were clients of commercial banks (74%).

In order to achieve the set goal, structure indicators and a non-parametric "chi" square test were used.

$$\chi^2 = \sum_{i=1}^r \sum_{j=1}^s \frac{(n_{ij} - np_{ij})^2}{np_{ij}} \quad (1)$$



where:

$n$  - sample size,  $r$  - the number of quality characteristics  $X$ ,  $s$  - the number of quality characteristics  $Y$ ,  $p_{ij}$  - hypothetical probability,  $n_{ij}$  - the number of sample elements having the  $i$ -th number of quality characteristics  $X$  and  $j$ -th number of quality characteristics  $Y$ .

The null hypothesis  $H_0$  was formulated thereby assuming the independence of the studied characteristics. If an inequality  $\chi_e^2 \geq \chi_a^2$  was observed after carrying out the test, the  $H_0$  hypothesis, assuming independence, was rejected in favor of the  $H_1$  hypothesis which assumed the dependence of the characteristics considered. All null hypotheses were verified at a significance level of  $p=0,05$ . In addition to primary sources, secondary sources were employed in the analysis. The results of the analysis are presented in a descriptive and graphical form.

### **3 Selected Financial Behavior of Bank Customers on the Market of Bancassurance Services in Poland**

Cooperation between modern banks and insurance institutions was initiated in the 1970s in Germany by the Sparkasse savings bank. The main reasons for the creation of such links were the lower and lower profits from traditional banking activities. However, the full development of bancassurance did not start until 20 years later, when French entities began to introduce and shape new forms of cooperation between banks and insurance companies [8,11].

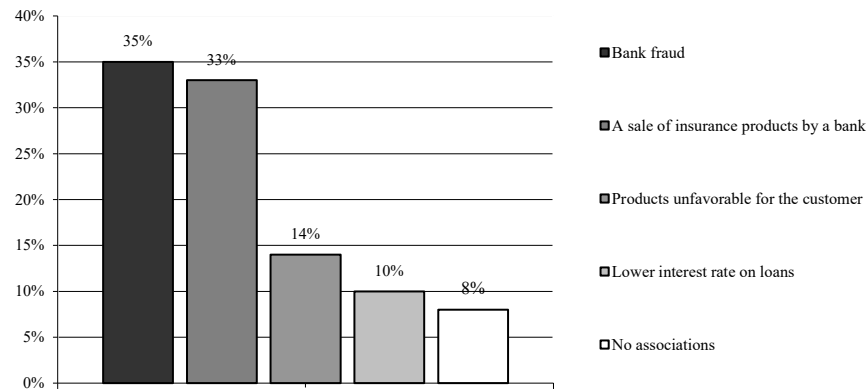
According to A. Koraus [7], bancassurance means the activity consisting in using the bank - its outlets, services and customers - to sell insurance, mainly life insurance and pension insurance. A. Głodek [3] points to the cooperation of banks and insurance companies consisting not only in the actual sale of insurance products through banking distribution channels, but also all factors related to the offering of insurance by banks, such as, among others, legal, tax, cultural and social conditions. The P.V. Burdon [1] approach is also noteworthy. Burdon, which by this term means the design, creation, distribution and sale of traditional insurance services and investment products and services involving banking services, for a common base of existing and potential customers who meet their credit, investment and protection needs.

The Polish bancassurance market is constantly changing. Its dynamic development was particularly visible in 2013-2017, when insurance companies enthusiastically started cooperation with new entities. The partnership was based on the desire to increase the efficiency of resources and the income generated by them.

Despite the systematic increase in the level of financial and insurance awareness of citizens in Poland, a significant part of bank customers have never heard the term bancassurance (64% of respondents). Other people knew that there was such an offer on the financial market (36%). The results obtained are higher than those obtained by other authors, because in this case the subject of the analysis were only persons using banking services, who on average have a higher level of assurance literacy than persons who do not use any financial services [9,10]. In the conducted research, a higher level

of awareness was observed among men, people aged 18-55 years, respondents with a vocational and higher education, city dwellers and customers of cooperative banks.

In the next question the respondents were asked what they associate the term "bancassurance" with? The correct answer that it is a sale of insurance products by a bank was given by only one in three respondents (fig. 1). The term "bancassurance" was most often associated with "bank fraud" (35% of indications). Nearly 15% of the respondents indicated that these products are unfavorable for the customer. Every tenth person participating in the survey stated that they associate bancassurance products with lower interest rates on loans. It can be stated that respondents who indicated such an alternative also gave the correct answer because one of the forms of banking and insurance ties is cross-selling, i.e. sale in a package combining banking and insurance products. Very often, a borrower buying 2 products (loan + insurance) can negotiate a lower interest rate of the loan. Other people (8%) marked the answer: "No associations".



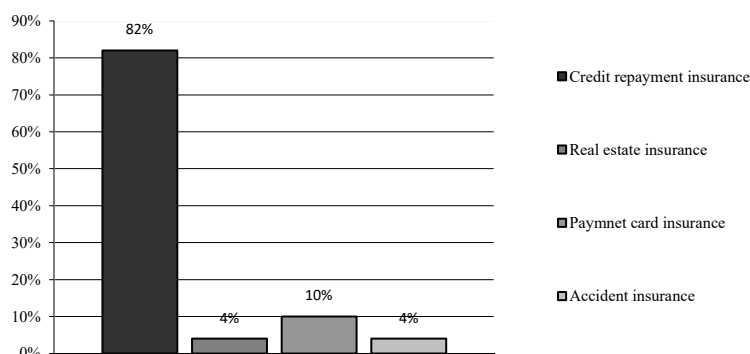
**Fig. 1.** Structure of respondents' answers to the question: "What do you associate the term bancassurance with?"

According to the statistical analysis, men ( $\chi^2=5.92$ ;  $df=1$ ), the youngest persons ( $\chi^2=7.77$ ;  $df=2$ ) with a secondary education ( $\chi^2=6.08$ ;  $df=2$ ), respondents running their own business ( $\chi^2=11.7$ ;  $df=4$ ) and clients of commercial banks ( $\chi^2=8.64$ ;  $df=1$ ) were characterized by a higher level of knowledge of the bancassurance term. There was no differentiation of respondents' answers regarding their place of residence ( $\chi^2=1.24$ ;  $df=1$ ).

Over half of the respondents did not make use of the possibility to buy insurance at the bank, justifying the lack of such a need. Other persons used bancassurance services (48%). The services offered by banks were most frequently used by women (64% vs. 51%), people aged 18-55 years (58%), with higher education (63%), working on a full-time basis (54%), the best earners (71%).

All insurance agreements signed were related to the purchase of a cross-selling product. There was no case of purchase of insurance alone (so called stand-alone strategy). As can be seen from the 2 figure, the most popular insurance product was

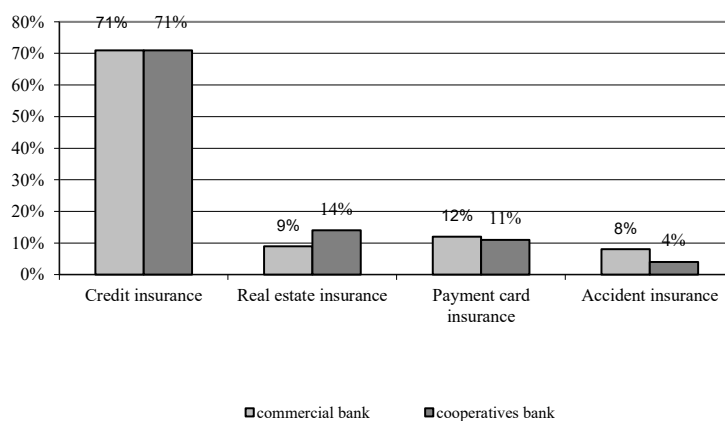
credit insurance (86% of all insurance products). In the case of credit insurance, a distinction is made between credit repayment insurance (life insurance, unemployment insurance, bridge insurance) and property insurance (real estate) in the case of mortgage loans. In the surveyed group, 82% of purchased insurance policies were credit repayment insurance, the remaining 4% were non-life insurance.



**Fig. 2.** Types of insurance used by respondents.

Every tenth consumer has purchased payment card insurance. In accordance with the regulations currently in force in Poland (as at 25.09.2018), the bank is fully liable for all unauthorized transactions carried out on the customer's account, provided that they occurred after the card was stopped. However, in the case of transactions performed before the card stoppage, the bank is liable only for transactions above EUR 150. In the case of contactless cards, the bank takes responsibility for amounts higher than EUR 50. After fulfilling certain conditions specified in the agreement, the insurer returns money stolen as a result of an unauthorized transaction in the amount of at least "own contribution to the loss". - i.e. EUR 150 in the case of debit cards and EUR 50 in the case of proximity cards to the bank's customer. The remaining 4% of agreements are accident insurance policies offered by banks for holders of bank accounts.

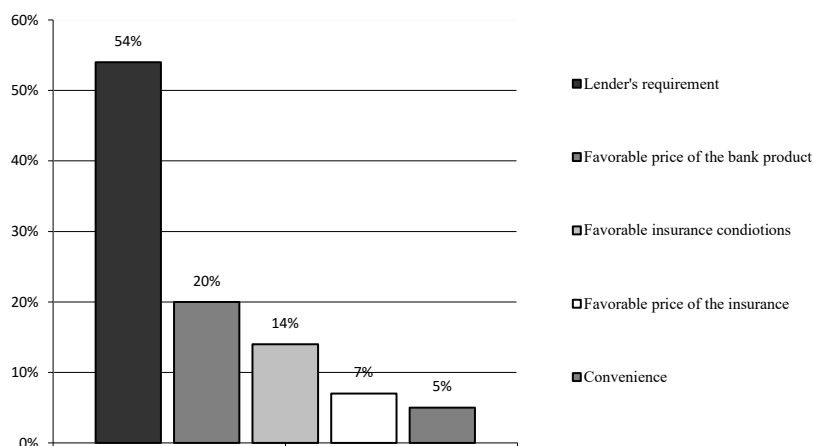
Bancassurance services were used equally by the customers of commercial banks and cooperative banks, while differentiation of the purchased insurance depending on the bank was observed (fig. 3). In the structure of insurance products both types of banks were dominated by credit insurance (71% of all policies). In commercial banks, the share of insurance against accident as compared to cooperative banks was twice as high as well as a lower share of real estate insurance policies (5% difference).



**Fig. 3.** Types of insurance policies in commercial and cooperative banks.

Respondents were asked about the main motive behind their decision to buy insurance from a bank. As can be seen from the 4 figure, more than half of the respondents stated that it was a lender's requirement. It should be remembered that credit insurance is only a requirement and not an obligation. As a result of the so-called U recommendation introduced in 2015 by the Polish Financial Supervision Authority, it is the law of the bank to present two offers to the customer - without additional insurance and with insurance policies. The customer has the right to familiarize themselves with this offer, consider its terms and conditions and make his own choice. The customer may also resign from the policy at any time, taking into account the fact that it will change the credit terms and conditions [6].

One in five respondents indicated that they decided to buy insurance from a bank because of the more favorable price of the bank product. This is particularly visible in the case of loans. Banks offer more favorable credit terms (e.g. lower interest rates, lower commission or margin) in exchange for the customer's use of the proposed insurance. Nearly 15% of respondents chose the bancassurance offer due to favorable insurance conditions. For 7% of the respondents, the main motive for purchasing a banking and insurance product in one package was a more favorable price of the insurance product, compared to alternative offers on the financial market. As another motive, respondents mentioned convenience (5%). When buying insurance in a bank with a banking product, the customer does not have to deal with any additional formalities (e.g. medical examinations in order to conclude an insurance contract).



**Fig. 4.** Motives of the respondents, which guided them when deciding to buy insurance in a bank.

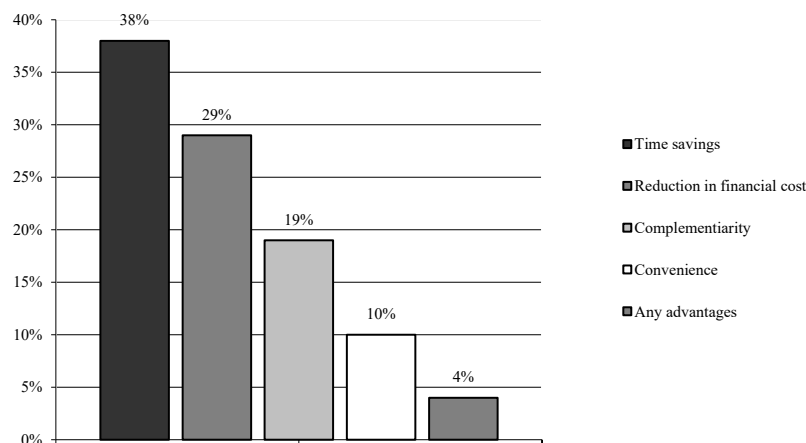
The possibility of choosing an insurance company by the customer in a bank depends on the number of insurance companies with which banks cooperate. According to the conducted research, in most of the analyzed cases banks offered insurance products of only one insurance company (86% of indications). Nearly 15% of respondents had a choice, because the bank whose services they used cooperated with at least 2 insurance companies. According to the statistical analysis, customers of commercial banks more often than cooperative banks had a choice of insurer (7 p.p. difference).

According to the respondents, the weak point of combined sales of banking and insurance products is the low level of knowledge of some bank employees regarding the policies offered. Nearly 40% of respondents did not receive reliable and understandable information about insurance policies. These results coincide with those of other surveys [5].

An important issue from the point of view of financial or insurance awareness of consumers is their knowledge of institutions that deal with consumer protection in the banking and insurance market. On the financial market in Poland, the most important institutions of this type are: The Office of Competition and Consumer Protection, Polish Financial Supervision Authority, Financial Ombudsman and Municipal Consumer Ombudsman. According to the research conducted, bank customers have little knowledge about where they can submit complaints on banking or insurance services. Only every twentieth person participating in the survey was able to list all four basic institutions. Nearly 15% of respondents indicated 3 institutions. Every fourth participant of the survey was able to name only 2, and every third one of them.

The literature mentions the various advantages for banks and insurance companies of selling insurance through a bank (possibility of generating additional profits, use of new distribution channels to sell insurance services), as well as the customers themselves [8]. Another question asked by the respondents concerned their indication of the advantages of the bancassurance offer. According to the respondents to the study,

the biggest benefit is time savings. Such an answer was provided by almost 40% of respondents (fig. 5). Nearly 30% of respondents indicated a reduction in financial costs in the form of lower interest rates, margins, commissions or lower insurance premiums. Nearly 20% of survey participants mentioned the complementarity of financial products. Every tenth person indicated convenience. The answer "I do not see any advantages of buying a banking and insurance product in one package" was indicated by 4% of respondents.



**Fig. 5.** Advantages of the bancassurance offer for bank customers.

## 4 Summary

Consumers' knowledge of insurance services is one of the elements of insurance awareness. The conducted research allowed to characterize and assess the level of knowledge of bank customers about bancassurance services. According to the analysis, the majority of bank customers claimed that they had never met the concept of bancassurance, despite the fact that some of them used a joint offer of banks and insurance companies during the analyzed period. Most often, the term was associated with bank fraud. Only one person in three could correctly explain the meaning of the term. A higher level of knowledge of the term "bancassurance" was characteristic of men, people up to 35 years of age, with secondary education and customers of commercial banks.

Almost every second respondent in the discussed period benefited from the purchase of insurance in a bank. The most frequently purchased product was credit insurance (credit insurance and real estate insurance), which is one of the possibilities of securing a bank credit. Bancassurance services were most often used by women, people aged 18-55 years, with higher education, employed and best earning.

An area of knowledge that requires urgent educational activities is the knowledge of institutions dealing with consumer rights protection in the financial market. According

to the conducted research, few bank clients know these institutions. The presented research results indicate that the current way of promoting financial knowledge conducted by various entities in Poland is not very effective. There are no campaigns that could popularize basic knowledge about consumer rights on the market in the whole society. Properly conducted educational activities increase the insurance awareness of market participants. Consumers are better prepared for contacts with the insurance company, they know more about their rights and are more and more effectively able to enforce them, also using institutional forms of assistance.

Due to the high level of complexity of bancassurance services and the lack of fuller knowledge about them among bank customers, employees of financial institutions should be the first to receive insurance education. According to the conducted research, almost 40% of customers using cross-selling of banking and insurance products drew attention to the incomplete knowledge of bank employees regarding the insurance products sold.

Taking into account the growing level of consumers' awareness of bancassurance services, it would be interesting to conduct research in subsequent periods in order to determine the dynamics and directions of changes taking place..

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## Reasons of Employees' Fluctuations from the Perspective of Employers in the Slovak Republic

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**Abstract.** The article deals with the up-to-date questions of workforce fluctuations in SR. It declassifies the results of primary research, which was carried out in small and medium sized companies operating in SR with a majority capital participation of domestic capital. It reveals the changes on the labor market which occurred after the general economic crisis, as well as the influence of the demographical development and generation changes in the behaviour of the workforce. It provides with a view on the problem of the fluctuation from the perspective of the employers. It identifies the reasons of employees for leaving the company and tools for keeping the quality of the workforce in the company, i.e. to reduce the fluctuation. It also outlines the need for a change in the employers' behaviour against their employees and the need to create targeted, company-tailored anti-fluctuation programs with the purpose to set up a high-quality intellectual company capital as its competitive advantage. It reviews the results of the research, which was carried out within the VEGA project no. 1/0309/18.

**Keywords:** Fluctuation, Employer, Keeping Employees.

### 1 Introduction

The problem of employees' fluctuation, i.e. the mobility of employees between companies/organizations and within the external labor market, when the employees leave the company/organization from various reasons, started to be examined as a complex problem in the SR after the economic crisis. Even more problems on the labor market were escalated after the economic crisis which were caused by different factors relating mainly to the characteristic of the Slovak economy - being a totally open economy. In the period after the economic crisis several companies began gradually exchanging their old technologies for new ones, started new production processes, new work places emerged, what led to an increased need of a high-quality workforce [1]. At the same time, this resulted in a bigger asymmetry between demand and supply of workforce on the labor market, in favor of the demand for qualified workforce. The demand for qualified workforce reached the limits of the Slovak labor market and provoked a fluctuation of the workforce at the

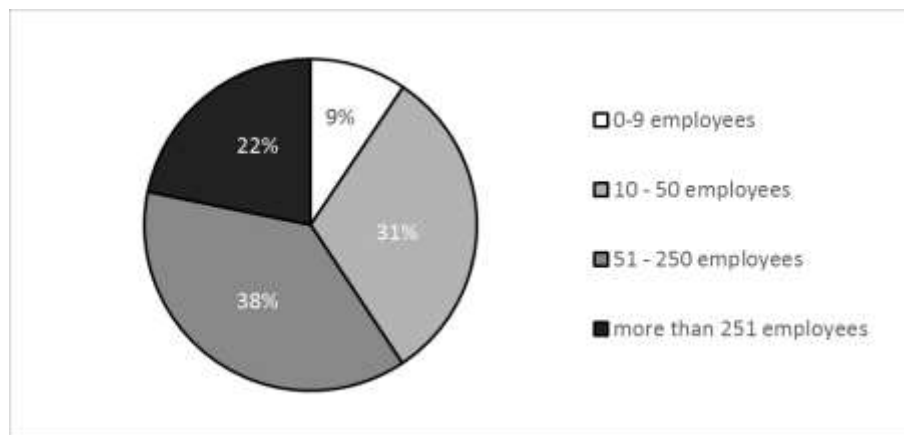
same time. The employers, who wanted to keep the qualified workforce in their companies needed to change and their gradually changed their behaviour to overcome certain pressure practices from the side of the employees [7]. Furthermore, they needed to search for workforce outside the Slovak labor market, and they even did. The lack of qualified workforce on the Slovak labor market, which was significantly increased by the fluctuation of employees at the end of the 1st decade of the new century, forced and until now still forces employers, beside others, to learn and study the needs of employees, their dis/satisfaction in the company, the reasons for leaving the company and based on this knowledge to create such conditions for keeping them in the company [4]. From this perspective, the reasons of fluctuations in Slovak companies were examined too, such as the possibilities of their reduction or their complex elimination.

## **2 Results of the Research on Employees' Fluctuations from the Perspective of Employers in the SR**

There are two contradictory opinions on the fluctuation of employees in professional literature. One group of authors considers employees' fluctuation as a positive phenomenon, which contributes to the "renewal of the company's sound development" [2], and on the other side there is a group of authors [3], who see fluctuation as negative, "threatening the existence of the company". However, both groups of authors try to answer the question, what is the "proper level" of fluctuation of employees, i.e. such level, which doesn't threaten the company yet and it develops its intellectual capital at the same time. Several authors agree that a sound level employees' fluctuation should be around 10%. In the SR in 2016 the level of employees' fluctuation represented 21.5%, in 2017 it exceeded the 30% threshold and its rise still continues. In this context several questions are raised, which are directly related not only to strategic visions of companies/organizations, their competitiveness but also to their current performance [6]. It turns out, that the problemacy of fluctuation is much wider, complex and fundamental, as it has been assumed in professional literature by now. This perspective was taken into account when defining the goal of the research, which focused on revealing the reasons and sources of fluctuation from both subjective and objective perspective [5].

In the research on studying the reasons of employees' fluctuations from the perspective of employers, 50 small and medium sized companies were addressed, which are active in the SR in various sectors with a various capital participation (including subsidiaries of supranational corporations) and where the level of employees' fluctuation exceeded 20%, i.e. the double of the "sound" level of employees' fluctuation. 32 from the total of addressed small and medium sized companies took active part in the research, what represented 100% of respondents, out of which 37.5% were companies with 51-250 employees and 31.3% were small companies with 10 to 50 employees. The structure of the respondents' sample is demonstrated in the Fig. 1. The sample of the respondents composed of employers'

representatives: owners of the company, managers, personal managers and team leaders, who directly experienced the fluctuation of employees.



**Fig. 1.** Sample of examined companies according to the number of employees.

Basic methods of science work were used to examine the mentioned problem: method of analysis, classification, synthesis, comparison, induction, deduction, description and generalization. For testing hypothesis, methods of statistical induction, methods of analysis of qualitative features dependencies – correlation analysis were used. In order to compare employees on the basis of various indicators, which characterize them, methods of multicriterial evaluation were applied. To gain data in the primary research, the method of participating observation, questionnaire method and structural interview method were used. For distribution and information collection the combination of traditional and e-communication tools was used. For processing and evaluation of gained data and information and for statistical modelling, statistical-mathematical methods and SPSS software were used.

The first goal of the research was to find out the reasons of employees' fluctuation in companies from the perspective of employers. Based on the methods applied and evaluation of the gained data, a correlation matrix of employees' fluctuation reasons from the perspective of employers was compiled (Table 1).

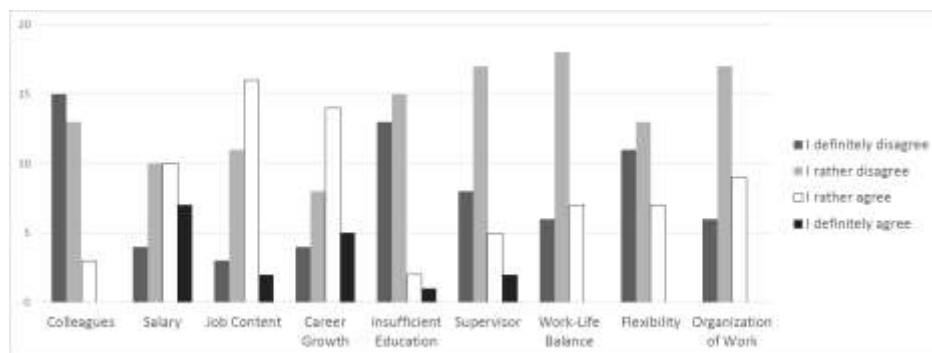
**Table 1.** Correlation of reasons for starting monitoring fluctuation in a company from the perspective of an employer.

	Increased level of leaving employees	Change of the management	Regulation from the mother company	Interest of the management about this problemacy	Interest of personal management dpt. about this problemacy	Need to react on the changes on the labor market
Increased level of leaving employees	-					
Change of the management	0.281	-				
Regulation from the mother company	0.131	0.244	-			
Interest of the management about this problemacy	0.464	0.272	0.347	-		
Interest of personal management dpt. about this problemacy	0.388	0.257	0.429	0.436	-	
Need to react on the changes on the labor market	0.311	0.016	0.34	0.336	0.474	-

Based on the correlation matrix it was found out, that the interest of the company's management and company's personal management department about the problemacy of employees' fluctuation reports a significantly strong relation with an increased level of the employees leaving the company. The outcomes of the research also showed, that the attitude of the mother company to employees' fluctuation in its subsidiary reports medium values, what can be interpreted as a proportional adoption of mother company's regulation in this area. The results of the research also document, that the interest of the personal management

department about studying the reasons of employee's fluctuation in subsidiaries of supranational corporations operating in the SR is proportionally increasing with the interest of the mother company about the problem of fluctuation in its subsidiaries. It is recorded by a moderate significant relation.

On the basis of the results of the secondary research, an inventory of the reasons of the employees' fluctuation was compiled, which was elaborated into a questionnaire form and submitted to the respondents – representatives of the companies. The gained results were highly corresponding with the data from the secondary research. The respondents marked salary and career growth as most frequent reasons for employees leaving companies. On the contrary, most respondents did not mark interpersonal relationships, education and work environment as common reasons of leaving employees. However, the research revealed latent/hidden reasons of employees' fluctuation which were mainly the personality and behaviour of the direct supervisors, his/her managerial skills, competencies and communication. 14,5% of respondents marked behavior and communication of the supervisors on higher levels of management, who are in rare direct contact with employees and are mostly perceived more or less via intermediation, as a reason for leaving the company. These factors were marked mostly by line managers as hidden reasons for frequent leaving of high quality and creative employees. This finding doesn't correspond with the findings, which were gained from the top management respondents and company owners, as well as the findings in the area of work-life balance. The reasons of employees leaving the company from the perspective of employers is demonstrated on the Fig. 2.



**Fig. 2.** The most frequent reasons of employees leaving the company from the perspective of the employer.

The next area examined by the research was the area of identifying tools which the company/employer uses to reduce fluctuation of employees. Hence, all addressed subsidiaries reported a huge problem with employees' fluctuation, we have focused on

gaining data about the tools used for keeping high-quality employees in the company, thus reducing employees' fluctuation in general. The outcome was a finding that company managements consider the elaboration of an anti-fluctuation program as the only tool to reduce employees' fluctuation. The research showed that 15,6% of examined companies has a plan to elaborate such a program, and 68,8% doesn't have this kind of program and doesn't even have a plan to prepare such program, since the companies are waiting for the instruction of the mother company. Despite this fact, the addressed respondents stated, that they consider the anti-fluctuation program as a solution of the situation.

**Table 2.** Correlation matrix of reasons of employees leaving the company from the perspective of the employers.

	Colleagues	Salary	Job Content	Career Growth	Insufficient Education	Supervisor	Work-Life Balance	Flexibility	Organization of Work
Colleagues	-								
Salary	0.36	-							
Job Content	0.33	0.451	-						
Career Growth	0.055	0.328	0.267	-					
Insufficient Education	0.183	0.396	0.247	0.452	-				
Supervisor	0.461	0.109	0.205	0.128	0.51	-			
Work-Life Balance	0.118	0.317	0.122	0.006	0.11	0.322	-		
Flexibility	0.29	0.036	0.015	0.123	0.375	0.14	0.284	-	
Organization of Work	-0.102	0.067	0.195	-0.164	0.049	0.224	-0.08	0.34	-

Based on the results of the secondary research we have assumed, that the adaptation program of the company and the methods of its implementation, in the basic scheme of achieving the biggest junction possible between company's and employees' needs, has a significant influence on the reduction of employees' fluctuation. According to many studies and professional expertise in the area of employees' fluctuation, the junction between the company's and employees' needs is one of the most important tools for employees' fluctuation reduction. This "junction" should be part of the adaptation and later adjustment program elaborated for a specific employee, who the company wants to keep to the future.

The results of the research showed that 62.5% of examined companies has an adaptation program for specific employees with the aim to keep them, or to impede their future leaving from the company. 37.5% of companies doesn't have such adaptation program.

In the next step, the relation between adaptation program and program for anti-fluctuation measures was examined. We were interested, whether there is an influence and if so, in what extent, of a correctly drawn up and implemented adaptation program on the employees' fluctuation. The results are shown in Table 3.

**Table 3.** Correlation of adaptation program and program for anti-fluctuation measures.

	Elaborated adaptation program	Elaborated program for anti-fluctuation measures
Elaborated adaptation program	-	0.231
Elaborated program for anti-fluctuation measures	0.231	-

The results of the research didn't confirm any mutual dependency between the implementation of the adaptation program and the program for anti-fluctuation measures. Similarly, the mutual dependence between the employees' reasons for leaving the company and an increased discrepancy between the supply and demand of workforce on the labor market in favor of the supply of the workforce, was not confirmed (Table 4). This means, that the situation on the labor market is not the main reason for the employees leaving the company, or it is not the reason for the increased employees' fluctuation. Other results showed, that the demand of the workforce, which is signalized by the employers and perceived by the employees, is not the main reason of employees leaving their companies. The same feature was found out when identifying the reasons of the fluctuation of key employees and their stimulation (Table 5).

**Table 4.** Correlation between the demand of workforce and employees' reasons for leaving the company.

	Employees' reasons for leaving the company	Lack of workforce
Employees' reasons for leaving the company	-	0.116
Lack of workforce	0.116	-

**Table 5.** Correlation between the perception of the fluctuation and stimulation of key employees.

	Perception of fluctuation as positive or negative phenomenon	Stimulation of key employees
Perception of fluctuation as positive or negative phenomenon	-	0.005
Stimulation of key employees	0.005	-

On the basis of our research we have found out, that there is a strong significant relationship between monitoring fluctuation and identifying its reasons directly from the leaving employees. The increasing level of monitoring fluctuation proportionally increases the identification of the reasons for leaving the company.

### 3 Conclusion

The primary need of the subsidiaries' managers on the Slovak labor market is to maintain high-quality employees. This need is specifically defined in economic terms. The costs related to the recruitment of a new employee exceed from 25-200% of the annual salary of the leaving employee. These costs consist of a sum of direct costs related to the termination of employment (termination interview, administration and communication with national and public authorities) and direct costs associated with searching, attracting and recruiting the new employee encompassing the overall selection process starting from the advertisement of the vacant job position, its administration, sorting of received documentation (curriculum vitae and other supportive documents sent by the applicants), verification of documents and references, possible cooperation with recruitment agency, organization and administration related to the invitation of applicants, complex organization of the selection process including the set-up of the selection commission, its rules, procedures and methods of selection, evaluation of the selection process and recruitment of the applicant for the vacant position, which is linked with considerable financial resources. Additional costs, both direct and indirect, arise from the recruitment of the employee, for example costs for the adaptation of the employee, his incorporation and possible training which is needed for carrying out the work on his position. Except for the specifically economically defined direct costs, there are indirect financial costs which arise both when the employee is leaving the company and when the selected applicant is recruited. It is particularly difficult to economically quantify these costs in financial terms, though these are in most cases much higher than the quantifiable ones. Notwithstanding, they should be also taken into account. These costs are for example related to the stress which is present in this process, the risk, the uncertainty whether the new employee will stay in the company, or whether he will fit



to the team, or identifies himself with the strategy of the company, respectively whether there is a sufficient conjunction of his needs with the needs of the company within the necessary time horizon etc.

Based on the results of the research, even though these are mostly of an information character and cannot be generalized, the fluctuation of employees from the perspective of the employer is not perceived as a simple problem. To handle this, it is assumed to dispose with a thorough personal policy based on defined strategic company goals and knowledge together with the acceptance of the in-house reasons and sources of fluctuation in the given company, which might be mostly influenced by changes of short-term and also long-term development trends on the labor market. A thorough analysis of the reasons and sources of fluctuation in the given company may give basis for an intended creation of conditions for their limitation or even elimination. The effort to reduce the fluctuation led some companies to set up anti-fluctuation programs. Some companies (3%) achieved a slight reduction in the level of fluctuation by applying anti-fluctuation programs, however, overall the expected result was not reached. Even though, there were 4 companies which used fluctuation for a complete restoration of the company's intellectual capital. These companies consider fluctuation as a positive phenomenon with a positive impact on the behavior of the rest of the employees, by which the argument of W. Burgess [2] was confirmed – the fluctuation of employees in the case of a thorough personal policy can have positive aspects mainly in “getting rid of” redundant employees, what more, the company can organize and regulate the resignation of redundant employees, i.e. employees, who don't fit the company's needs from the view of its future vision, or alternatively costs for involving such employees into the innovative interests and needs of the company, would be inadequately high in comparison with the low return on such investments. These positives were also listed by the respondent companies, which regulated the fluctuation of the employees from the perspective of the company's needs regarding human resources. The rest of the respondent companies considered fluctuation as a negative phenomenon, which is according to them linked to a high risk of maintaining their competitive position on the market. These companies, in the interest of their further existence acceded to creation of anti-fluctuation programs.

Finally, it can be concluded with the support of the results from the research, that fluctuation of employees is not a one-off phenomenon which appears in the company. In principle, it is a gradual process, which in case is not regulated it contradicts the interests and needs of the company and its strategy. It can have various phases – latent and open. It can have features of mass psychosis, spreading across the company as a cancer, taking over more and more employees (the snowball effect). It can change into a long-term process with an uncertain and, for a company, usually negative result. From this reason, it is more than desirable and necessary to pay due attention to the reasons and sources of fluctuation from the perspective of employers.

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## Transformation of the Subjective Structure of the Polish Food Industry in 2004-2016

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**Abstract.** In order to identify the directions of changes in the subjective structure of the Polish food industry, including development of concentration and consolidation processes, this article carries out statistical and descriptive analyses of the changes in these structures. This analysis presents shares (current status and its changes in the period of Poland's membership in the EU) of individual groups of enterprises, both in the total number of entities and the average employment, and in the value of sold production. Changes in the subjective structure in the entire food industry and in its individual branches were analysed, dividing them into groups of branches with the highest, average and the lowest level of concentration. In addition, a comparison of the subjective structure of the food industry in Poland and in the European Union was made. The analysis uses published and unpublished statistical data of the Statistics Poland and the Eurostat. The conducted research proved that the progressing processes of regional integration and economic globalisation have fundamentally changed the directions of development of the subjective structure of the food industry in Poland. The processes of concentration and specialisation of production, which consist in a decrease in the number of active companies, mainly the smallest ones, and an increase in the number and share of large companies in the production and employment, take place in this sector. During the period of Poland's membership in the EU, the subjective structure of the food industry became similar to the structure observed in the EU Member States.

**Keywords:** Food Industry, Subjective Structure, Concentration Processes, Poland, European Union.

### 1 Introduction, Objective, Method

In the current economic conditions, various types of structural changes should be an important element of the country's economic policy, responsible for the proper development and competitiveness of the national economy. As far as international competitiveness is concerned, i.e. in relation to other national economies, concentration of production plays a particularly important role. It is in the interest of many economists because it affects not only the costs and efficiency of production, but also allows determining the competitive advantages of leading producers on the market and the strength of their impact on competitors.

Concentration process taking place in the economy in which enterprises participate can be defined as a growing quantitative advantage of a specific group in the entire

population of units forming a given community. If the phenomenon of concentration is referred to the industry, then it can be assumed that it is a process of increasing the size of individual enterprises (due to the increase in production scale) or the process of diversifying their size, leading to the advantage of the largest producers in a given branch [6]. The concentration of production can be equated with the index of market power. The higher the degree of concentration in the sector, the greater is the market power of individual participants [3]. The degree of concentration also informs how much the participants of the sector are dependent on each other. Porter writes that the progressive asymmetry between the participants of the sector may allow the strongest manipulation of others [5]. Therefore, it turns out that the concentration process can lead to the creation of a monopoly, if only a given producer manages to obtain exclusivity for the production of a given product. Concentration of production is a kind of a way to gain a market advantage and that is why enterprises strive to achieve it. However, in the current economic conditions, concentration of production is not always enough to achieve and maintain a competitive advantage which also depends on many other factors that determine the market success of the enterprise.

In order to identify the main directions of changes in the subjective structure of the food industry in Poland, this article analyses the concentration processes in the Polish food industry and its most important branches. This analysis presents the shares of individual size classes of enterprises both in the total number of entities and in average employment, and in the value of sold production. Changes in the subjective structure in the entire food industry and in its individual branches are shown, dividing them into groups of branches with the highest, average and the lowest level of concentration. The subject of analysis was data for 2004, 2007, 2011 and 2016. The selection of these periods illustrates the state in the first year of Poland's accession to the EU (2004), after joining the EU and at the same time before the global economic crisis (2007), during the economic slowdown (2011) and the current state (2016). In addition, a comparison of the subjective structure of the food industry in Poland and in the European Union was made, paying attention to the assimilation of these structures. The analysis uses published and unpublished statistical data of the Statistics Poland and the Eurostat.

## **2 General Directions of Changes in the Subjective Structure of the Food Industry**

Food processing belongs to the industries which are characterised by large dispersion and low level of concentration. This results from the lower level of technical development of this industry (it belongs to the group of the so-called low technology industries) and the nature of the subject of work, determined by the variability of processed agricultural products. Important features of the food industry include its strong link with local and regional markets, large versatility of inventory and fairly short series of production, as well as relatively short "best before" dates of products. These characteristics of food production are conducive to conducting business in this sector by micro, small and medium-sized enterprises. The food industry is therefore the

area of the economy particularly predestined for development of small and medium-sized enterprises (SMEs) [9].

In 2016, nearly 16 thousand business entities were operating in the food industry (Table 1), including:

- 10.1 thousand micro companies (employing up to 9 people), constituting as much as 63.5% of all food companies, whose share in employment amounted to 13.6%, and in sales only 4.4%;
- 4.4 thousand small enterprises (employing from 10 to 49 people), which accounted for 27.7% of the entire community, and their share in employment was 18.2% and in sales 13.0%;
- 1117 medium-sized enterprises (employing between 50 and 249 people), i.e. 7.0% of all food companies; whose share in employment was 26.9%, and in sales 26.3%;
- 286 large companies (employing more than 249 people), which constituted only 1.8% of the entire community, but their share in employment was 41.3%, and in sales as much as 56.3%.

**Table 1.** Subjective structure of the food industry in Poland in 2004-2016 by the size of enterprises (measured by the number of employees) [7].

Detailed list	2004	2007	2011	2016
The number of enterprises				
Total	19,696	16,727	15,185	15,899
including: micro (up to 9 employees)	13,039	10,469	9,035	10,100
small (10-49 employees)	5,158	4,738	4,716	4,396
medium-sized (50-249 employees)	1,227	1,232	1,156	1,117
large (more than 249 employees)	272	288	278	286
Average employment (in thou. persons)				
Total	456.1	462.7	453.3	450.8
including: micro (up to 9 employees)	70.7	66.7	61.9	61.2
small (10-49 employees)	96.1	90.7	92.6	82.0
medium-sized (50-249 employees)	133.1	134.5	125.1	121.2
large (more than 249 employees)	156.2	170.8	173.7	186.4
Sold production (in current prices, in PLN billion)				
Total	113.5	141.8	179.3	215.1
including: micro (up to 9 employees)	7.6	8.8	7.5	9.5
small (10-49 employees)	18.6	20.9	27.1	28.0
medium-sized (50-249 employees)	35.6	39.1	46.8	56.6
large (more than 249 employees)	51.7	73.0	97.9	121.0

Throughout the period of transformations adapting the food industry to function in the conditions of integration with the European Union and progressing economic globalisation, together with the change of ownership, production, production potential, trade and other structures, the subjective structures of this industry also changed. In general, in 2004-2016, three stages of these transformations can be distinguished.

The period between 2004 and 2007 were years of Poland's integration with the European Union and a significant economic recovery. In this period, processes of concentration of production began to appear in the food industry. Along with the strengthening of the position of Polish food producers on the EU market, new circumstances which affected changes in the subjective structures of the food industry appeared. These circumstances included, among others, restructuring conducted by capital groups and sector leaders, which increased their market expansion capabilities and enabled them to function on the global market. The fact that the standards required by the EU were achieved mainly by large enterprises, which had the greatest chance of foreign expansion, was also of significance. For these reasons, the concentration trend, with the simultaneous development of specialisation of the production, returned. The area of activity for micro and small industrial enterprises started to narrow, the position of medium-sized companies was reducing, and the importance of large enterprises grew considerably [8]. The consequence of such directions of changes in the subjective structure was the reduction in the number of active companies, mainly the smallest ones, and the reduction of employment in the food industry which, together with the increase in production, brought a significant increase in labour productivity in this sector.

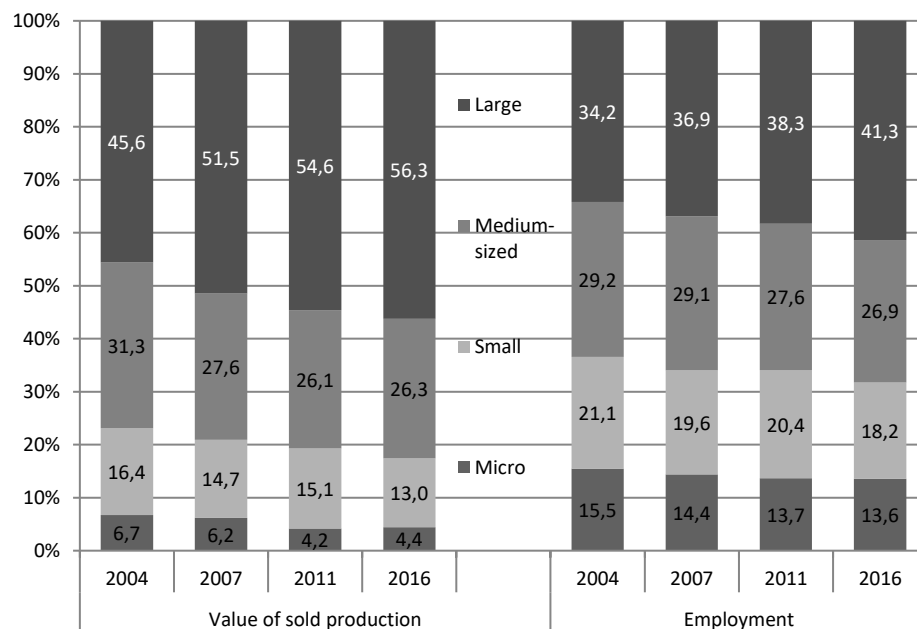
The period between 2008 and 2011 were, in turn, years of dynamic changes in the food industry, caused mainly by fluctuations in the economic conditions on the global market. When the global economic crisis became apparent, from mid-2008 to mid-2009, development of the food industry slowed down. After this period, the recovery of the food industry returned but its scale was smaller than before the crisis. The willingness of companies to invest was still limited [8]. As a result of these phenomena, the number of active companies, mainly micro, small and medium-sized ones, was further limited which, however, did not result in very large changes in the subjective structure of the food industry. Further increase in the importance of large enterprises in the turnover of the sector, demonstrating the continuing trend towards concentration of production, was the most noticeable.

In 2012-2016, there was a relative stabilisation of macroeconomic factors. During this period, the food industry in Poland was under strong pressure of declining domestic demand which limited the growth in the production of the food industry. The main factor of development of the food industry was export which managed over half of the increase in sold production of this sector. The second factor in development of production in the food industry was the increase in food sales prices. In 2016, domestic demand also stimulated the growth of sold production of the food industry. The increase in the sector's production took place in conditions of a relatively stable level of employment and growing investments [9]. The changes in the number and structure of the food industry companies in Poland which took place in this period point to the continuation of production concentration processes because in this period the share of large enterprises in production and employment increased, with the weakening of the position of the smallest industrial companies.

The structural changes caused a significant reconstruction of the subjective structure of the food industry, measured by the share of various size classes of entities in the number of enterprises, the value of sold production and employment of the entire food

industry. As a result of the above transformations, the following changes in the subjective structure occurred in 2004-2016 [7]:

- the number of micro and small enterprises decreased 19.3%, while the number of employees decreased 11.2% and sold production in constant prices increased 14.0% and labour productivity 32.8%;
- the number of medium-sized companies decreased 9.0%, their employment 8.9%, while the production sold in constant prices increased 26.8%, and labour productivity 39.2%;
- the number of large enterprises increased 5.1%, with the increase in manning of 19.3% and the increase in sold production in constant prices of as much as 86.0% and labour productivity 55.9%.



**Fig. 1.** Subjective structure of the food industry in Poland in 2004-2016 (in %) [9].

Changes in the subjective structure of the food industry occurring in 2004-2016 (**Fig. 1**) resulted primarily from the need to meet the requirements related to the integration of Poland with the European Union, the fulfilment of which was associated with concentration and specialisation of production. The food industry was also included in the processes of economic globalisation, mainly due to the functioning of international enterprises, at an accelerated pace. Developing transnational corporations became a source of strong impulses changing developmental conditions. Along with their popularisation in the Polish food industry, their impact on both other enterprises in this sector and the entire food market increased. Global corporations, both directly, i.e.

taking an active part in production and trade, and indirectly, i.e. influencing the behaviour of other entities (among other, the directions of restructuring of enterprises with domestic capital), changed the rules of functioning of the sector and influenced increase in its concentration [4]. Transnational corporations exist as entities taking part in the globalisation process and many authors tend to consider that they decide on the fate of the world. Their operation is the key economic force driving the globalisation processes in the economic area, which they change as well. The leading significance of the transnational corporations in the globalisation of the world economy results from their economic strength and advantages related thereto [1]. Changes related to the functioning of Poland within the EU and in the conditions of economic globalisation significantly changed and are still changing the subjective structure of the food industry.

### **3 The Intensity of Concentration Processes in Individual Branches of the Food Industry**

The level of concentration of the food industry in Poland varies in individual branches. In this respect, the main directions of food processing can be divided into three groups, i.e.: branches with a high level of concentration, branches with an average level of concentration and highly fragmented branches.

Branches of industry with a high level of concentration are at the same time branches with high consolidation and even globalisation in which the share of large companies in the value of sold production of a given branch generally exceeds 60%, and 3-4 largest capital groups dominate the domestic market. This group includes the following branches: sugar, brewing, non-alcoholic beverages, confectionery (production of chocolate products and preserved pastry), and to a smaller extent also dairy, fish, oil and spirits branches (**Table 2**). In 2004-2016, the level of concentration of almost all of these branches increased. Among the branches with a high level of concentration, a small drop in the share of large companies occurred only in the oil and brewing branches, but these branches are still among the most consolidated ones.

The group with an average level of concentration are the basic branches of the food industry, such as meat, poultry, potato or fodder, as well as branches such as coffee and tea processing and the production of fruit and vegetable juices and drinks (**Table 2**). So far, there has been no significant consolidation of enterprises in these branches, which weakened the position of Polish food producers on foreign markets and the possibility of negotiating with large retail chains. However, in the analysed period, the level of concentration in this group of branches increased considerably. It was particularly noticeable in the processing of coffee and tea.

The third final group are quite strongly fragmented branches where the majority of production is located in small, micro and medium-sized enterprises. There are no strong leaders in these branches, and the market share of large enterprises generally does not exceed 40%. These are branches of the industry such as: cereal, pasta, baking, wine, and fruit and vegetable (**Table 2**). Low level of consolidation limits the opportunities for development of export and sales of entities in these branches in large retail chains.



In 2004-2016, changes in the concentration level of these directions of food processing were multi-directional. The share of large companies in sales decreased in the fruit and vegetable branch, and increased in other branches.

**Table 2.** The share of large enterprises in the value of sold production of individual food industry branches in Poland in 2004-2016 (excluding micro enterprises, in %) [11].

Detailed list	2004	2007	2011	2016
Branches with the highest level of concentration				
Sugar	59.5	75.8	100.0	100.0
Brewing	84.4	90.8	87.5	85.4
Non-alcoholic beverages	60.6	68.2	76.0	73.8
Confectionery	72.3	75.2	79.2	70.9
Dairy	58.0	63.1	64.6	71.0
Fish	36.5	64.5	64.5	63.0
Oil	59.0	54.6	52.3	63.8
Spirits	38.8	45.0	65.5	61.9
Branches with an average level of concentration				
Poultry	49.8	51.1	65.6	54.8
Fruit and vegetable juices	59.8	51.3	43.9	65.9
Meat	41.6	43.6	47.2	56.9
Tea and coffee	44.3	54.0	61.0	74.3
Potato	62.5	67.0	51.8	62.5
Fodder	36.1	52.5	53.4	46.2
Branches with the lowest level of concentration				
Fruit and vegetable	39.5	49.5	40.6	31.2
Cereal	35.3	29.9	28.8	31.2
Pasta	10.2	14.5	34.6	32.5
Baking	6.6	12.9	17.5	29.4
Wine	0.0	0.0	0.0	41.6

Concentration processes are, therefore, a widespread phenomenon which occurs in all branches of the food industry. In recent years, they have been taking place the fastest in the sugar industry. Great progress in this area has also been achieved in the dairy, fodder, spirits, fish, coffee and tea and beer industry. In several branches, the subjective structure is oligopolistic as several capital groups dominate in them; these are sugar and beer branches, and partly also oil and spirits branches. The concentration processes are the slowest in branches with a fragmented structure of producers. This applies above all to the baking industry, and to a smaller extent also cereal-milling and milling fruit and vegetable.

#### 4 Subjective Structure of the Food Industry in Poland and in the European Union

In 2004-2016, the subjective structure of the food industry in the European Union underwent only minor changes (**Table 3**). The share of large enterprises in the value of sold production of the food industry decreased 2.1 percentage points (to 51.7%), and of micro and small entities decreased 0.7 percentage points (to 20.6%), which means an increase in the importance of medium-sized companies of 2.8 percentage points (to 27.7%). As regards the share of individual size classes of companies in the employment of this sector, the changes were minimal: the share of medium-sized companies (0.7 pp) and large enterprises (0.3 pp) increased, and the position of micro and small companies decreased (1.0 pp). Thus, large enterprises, which in 2016 in terms of quantity represented only 0.8% of all entities operating in the food industry in the EU, generated over 50% of sales in this sector and had about 40% share in its employment. It is clear that the subjective structure of the EU food industry shaped at a high level of concentration is stable and meets the needs of the developed European food market.

**Table 3.** Subjective structure of the food industry in Poland and in the EU in 2004-2016 (in %) [2].

	Poland				European Union			
Detailed list	2004	2007	2011	2016	2004	2007	2011	2016
By sold production value								
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
including: micro	6.1	5.7	4.7	4.1	6.2	6.2	8.7	5.8
small	11.1	9.9	12.0	9.7	15.1	13.7	15.1	14.8
medium-sized	29.4	24.7	28.2	28.4	24.9	26.0	28.7	27.7
large	53.4	59.7	55.1	57.8	53.8	54.1	47.5	51.7
By employment								
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
including: micro	10.9	8.6	6.6	6.7	11.8	11.7	12.8	11.0
small	17.6	16.2	17.0	14.7	21.7	21.4	21.7	21.5
medium-sized	32.0	31.6	31.8	30.8	26.3	26.5	27.3	27.0
large	39.5	43.6	44.6	47.8	40.2	40.4	38.2	40.5

Comparison of the subjective structure of the food industry in Poland and in the European Union in 2004-2016 (**Table 3**) clearly indicates that in this period Polish food industry was subject to a process of concentration consisting in a decrease in the number and share in the production of the sector of micro, small and medium-sized companies, with a significant increase in the position of large companies, while in the EU food industry a relative stabilisation of the subjective structure was observed. As a result of this direction of change, the subjective structure of the food industry in Poland became similar to the structure of this industry in the EU, as well as to the structure of this sector

in countries which are the largest food producers in the EU (such as Germany, Spain or France). Data for 2016 indicates an even slightly higher level of concentration of the food industry in Poland, measured by the share of large companies in the value of sold production (in Poland, it was almost 58%, while in the EU – 52%).

The convergence of the subjective structures of the food industry concerns not only the structure of the value of sold production but also the employment structure. In 2016, total share of micro, small and medium-sized enterprises in the employment of the Polish and the EU food industry was 52.2% and 59.5%, respectively, whereas large enterprises represented 47.8% of employment in the food industry in Poland and 40.5% in the EU.

Slightly larger differences concern the subjective structure of the food industry analysed by the number of enterprises. There are more micro companies in the European Union than in Poland, which account for almost 80% of all companies operating in this sector (63.5% in Poland), and the share of small (15.8%), medium-sized (3.8%) and large companies (0.8%) is smaller. However, the size of an average large enterprise (measured by turnover and employment) is much larger in the EU than in Poland [8].

## **5 Summary and Conclusions**

Nowadays, Polish economy is an important part of the global economy which is why it is subject to the rules and principles applicable in the market system. The conditions of functioning of enterprises in the global economy force entrepreneurs to take on new challenges, including increasing the size of companies and strengthening competitive advantages on the domestic, regional and international market related to this. Poland, being an element of this system, is subject to similar trends, including the phenomenon of concentration of production in the industrial processing sector. This also applies to the Polish food industry.

Development of regional integration and economic globalisation has changed the directions of development of the food industry's subjective structure in Poland. The processes of concentration and specialisation of production, which are visible in a decrease in the number of active companies, mainly the smallest ones, and an increase in the number and share of large enterprises in the value of production sold and in employment, take place in this sector. During the period of membership in the EU, the subjective structure of the Polish food industry assimilated to the structure of the food industry in the European Union.

In the conditions of strong external competition, each economy, in order to function and develop, needs a diversified subjective structure which, along with economic development, is undergoing flexible and dynamic changes. For this reason, the market in developed countries has a place for both small and medium-sized enterprises, and large and very large enterprises [10]. This also applies to the Polish food industry, in which there are no monopolistic systems and oligopolies occur only in some branches, but in which micro, small and medium-sized enterprises still play a significant role.

Concentration processes will continue in the Polish food industry, and large enterprises, including transnational corporations, will become more and more important. They will still be the initiator of structural changes and, being a serious competition for domestic producers, they will motivate them to take actions to improve their competitiveness. The position of micro and small companies and a large part of medium-sized enterprises, which due to the specificity of the food sector are an important component of the Polish food industry's subjective structure but have fewer opportunities for international expansion, will gradually decrease.

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## **Good Governance in Local Government Administration. The Results of Empirical Research.**

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**Abstract.** The aim of this article is to define the level of the adaptation of the local government units to the concept of good governance, and when posed in this way requires earlier operationalization by proposing a maturity model for local government structures in the scope of applying 'good governance' as suggested in the first part of this article. The second, empirical part presents the results of research conducted on this subject among the units of Polish local administration.

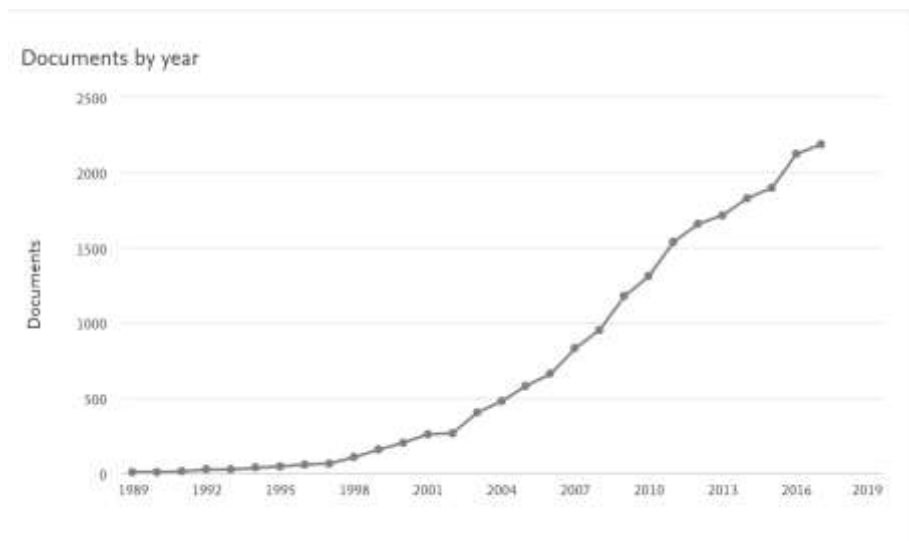
The publication was the outcome of the project entitled "Adaptation of the management system of local government office to the good governance concept" which was financed by The National Science Centre, based on the decision no. DEC-2013/09/B/HS4/01143.

**Keywords:** Good Governance, Public Governance, Maturity Model, Management System.

### **1 Introduction**

The concept of good governance appeared for the first time in 1989 in the study published by the World Bank [25, p. 60]. Since then definitions of this concept have also been proposed by other international banks (e.g. the African Development Bank, the Asian Development Bank), international organizations (such as the UN, the OECD, the EU) as well as governments and institutions in individual countries.

The concept of good governance, developed within the practice of management, has had a major impact on the on-going scientific discourse related to the significance of good governance [15, p. 51; 9, p. 14; 19, p. 170; 11, pp. 14, 23]. Data analysis in the Scopus data base has shown unfailing interest in the concept since 1989.



**Fig. 1.** Number of publications in the Scopus data base referring to the concept of good governance.

In the popular understanding, the meaning of good governance seems to be obvious (intuitively it can be included in the same semantic category as effective governance, efficiency of governance, etc.), however from theoretical viewpoint it is not the case. The problem with interpreting the concept of ‘good governance’ becomes particularly evident when it is necessary to make its meaning more precise and when answering the question of what are the characteristics requisite for the way of exercising authority to be described as good governance? An extensive review of literature covering the ways of interpreting good governance can be found in the works by R. M. Gisselquist [8], T. B. Jørgensen and D.L. Sørensen [13, pp.71-95]. These authors indicate the lack of precision in defining the essence of good governance and the conceptual chaos arising from the sharp differentiation of individual approaches to defining good governance, which prompts the need to offer the author’s own definition allowing to determine the scope of research for this study. Accordingly, good governance (as a concept embedded in the field of public governance), describes a positive vision of exercising authority in a democratic system which requires that both the rulers and the administrative institutions (regardless of their level) adhere during that process, in the public interest, to a set of specific principles (characteristics) of governance in order to deliver to the citizens the results they expect [20, p. 116]. An analysis of the proposals offered by international institutions [24, p. 39; 1, pp. 2-3; 2, pp. 8-9; 10, p. 6; 18, p.1170; 16, p. 19] regarding the proposed characteristics, in particular those of the EU [5, pp. 8-11], as well as the analysis of literature on this subject [17, p. 308; 14, p. 13; 4, pp. 13-14; 6, p. 54; 3, p. 951], allow to suggest the following principles of good governance [21]:

- transparency – carrying out an active information policy in relation to the planned and undertaken actions and availing all the indispensable information resources to

the potential stakeholders, including the implemented processes and procedures (excluding the information which should remain confidential for reasons of public interest).

- participation – carrying out actions based on transparency which enable the interested parties to participate in the processes of decision-making by the authorities. Participation requires both the existence of mechanisms facilitating cooperation and undertaking steps aimed at the involvement of interested stakeholders.
- efficiency and effectiveness – establishing and achieving, through the activities of the public administration, goals serving to satisfy the needs of the citizens, and at the same time aiming at minimizing the costs associated with these activities and the best possible use of the available resources.
- accountability – informing stakeholders, and in particular explaining and justifying actions undertaken by the authorities and the results thereof, whilst the stakeholders are entitled to asking questions and offering their judgement, and the subject under scrutiny may be held to account.

## **2 Methods**

The practical implementation of the concept of good governance is linked mainly with the indicative evaluation of countries and regions, while the operationalization of this concept at the level of local administration or formulating recommendations regarding the transformation of the management system in government units is relatively infrequent. Therefore the assessment of the degree of adaptation in the units of administration requires an earlier formulation of proposals regarding the translation of the concept into a model for evaluation.

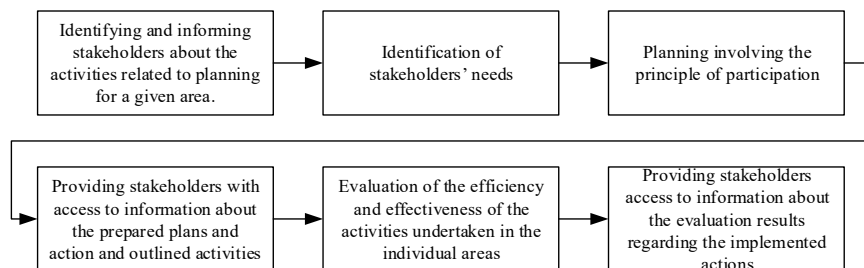
### **2.1 Operationalization of the Concept of Good Governance**

The operationalization of the indicated principles of good governance at the level of local government units requires a comprehensive view of such principles. An analysis of their content will allow for making an assumption about the existence of a sequence into which the principles of good governance can be included as the subsequent stages in the process of public management.

At the same time it is also necessary to determine the area of the influence of such principles on an organization such as a local government unit. Based on the most popular [12] models of organization in a systemic approach, such as the Weisbord model [23, pp. 430 – 447], Galbraith model [7, pp. 14-23] as well as that of Waterman, Peters and Phillips [22, pp. 14-26], the three basic elements of public organization in which the application of the principles of good governance is most vital are: strategy, processes and people.

The management process following the principles of good governance is oriented at shaping organizational solutions within the three identified above areas of organization (strategy, processes, people), is shown in Figure 2.





**Fig. 2.** Basic scheme of shaping the areas of organization according to the principles of good governance.

The starting point in the proposed process is the stage of identifying and of informing stakeholders about the future activities associated with planning solutions in any of these areas (i.e. strategy, processes, people). This stage relates to the transparency of actions and constitutes a condition indispensable for implementing the principle of participation, which in its turn is linked to the next two stages, that of establishing the needs of stakeholders and of ensuring their participation in decision-making. The information on the established solutions, in accordance with the principle of transparency, should be available to all the stakeholders, whilst the assurance of effectiveness and efficiency requires implementing mechanisms for the assessment of the functioning of the proposed solutions. An evaluation can be carried out from two viewpoints: internal, beyond the control function, ensures providing a set of management information; external, based on the assessment of the functioning mechanisms by external stakeholders which owing to the element of judgement made by the local community ensures the implementation of the principle of accountability. In addition, providing information related to the effects of the actions is linked both to accountability and transparency. Such an outcome is a consequence of basing the implementation of the principle of accountability on the transparency of the obtained results, just as in the case of the transparency of preparing plans which is the condition indispensable for observing the principle of participation.

A descriptive scale has been proposed for each of the listed stages, which can be used to evaluate the degree of maturity of local government units in the scope of implementing the principles of good governance (see Table 1). In the majority of cases within the individual evaluated areas of organization (strategy, processes, people) there are unified proposed levels of maturity. Slightly different levels of maturity were suggested only for the area ‘people’ in relation to the principle of transparency. This is caused by the idiosyncrasy of this area in which principally the stakeholders are the employees of local administration offices. In the presented proposal, transparency at the lower levels means enabling access to information to the staff, whereas at the higher levels it means providing access to information for all the interested parties.

**Table 1.** Levels of maturity using the concept of good governance.

		Strategy	Processes	People
Informing stakeholders (transparency at the outset)	Level 3	The use of information channels is assessed and the conclusions are used to improve communication with stakeholders.		
	Level 2	The way of passing information and information channels are adapted to the specifics of the groups of stakeholders.		
	Level 1	Potential stakeholders are identified and then informed about the commencement of the process of planning strategies /processes / solutions in HR.		
	Level 0	Stakeholders are not identified nor informed before the commencement of planning strategies /processes/ solutions in HR.		
Identifying the needs of stakeholders	Level 3	Research on identifying the needs of local community is conducted regularly, and the conclusions are included in the process of planning strategies /processes / solutions in HR.		
	Level 2	Research on identifying the needs of the local community is conducted irregularly while the conclusions are included in the process of planning strategies /processes / solutions in HR.		
	Level 1	There are tools allowing for the assessment of stakeholders' needs in regard of the desired strategies\ways of implementing processes\HRM. Research is incidental.		
	Level 0	Lack of tools allowing to identify the needs of stakeholders regarding: desired strategy, way of implementing processes, HRM.		
Participation in planning	Level 3	Stakeholders participate in: planning strategy/ processes /solutions in HRM. Decisions are made in complete agreement with stakeholders' expectations.		
	Level 2	Stakeholders participate in: preparing strategy/ planning processes /working out solutions in HR. Local authorities include in their decision-making these opinions of the stakeholders which are deemed legitimate.		
	Level 1	Stakeholders are given an opportunity to participate in: preparing strategy/ planning processes / working out solutions in HR, e.g. through contributing comments and suggestions for the planned solutions.		
	Level 0	Stakeholders are unable to participate in: preparing strategy/ planning processes / working out solutions in HR.		
Transparency of solutions	Level 3	Information about the borough's strategy/course of processes and regarding the adoption of stakeholders' postulates, including notification about the rejection of selected postulates and its reasons is generally accessible	Information about the solutions in HR is generally available for all the stakeholders (including local residents).	
	Level 2	Information about the borough's strategy / course of processes/ functioning solutions in HR, is generally available to stakeholders		
	Level 1	Information about: borough's strategy, course of processes, functioning solutions in HR is available only when requested by stakeholders.		
	Level 0	Information about: the borough's strategy/ course of processes/ functioning solutions in HR, is not made available.		

		Strategy	Processes	People
Assessment of efficiency and effectiveness	Level 3	There is a cyclical measurement of the efficiency and effectiveness in: strategy, processes and HR. The obtained information is analysed and used as basis for improvement.		
	Level 2	Measuring efficiency and effectiveness of strategy, processes and HR is irregular, while the obtained information is analysed and used as basis for improvement.		
	Level 1	Local administration implemented the tools allowing to measure efficiency and effectiveness of strategy/ processes/ HR, the measurement is incidental.		
	Level 0	Local administration does not have tools allowing to measure the efficiency and effectiveness of strategy/ processes/ HR.		
Evaluation of the actions by stakeholders (accountability)	Level 3	There is a systematic research on: measuring the degree of acceptance for the goals/ policies and the assessment of their realization on the part of the local community /evaluation of processes implemented by the administration/ survey of staff attitudes. The obtained information is analysed and used to improve policies.		
	Level 2	The measuring of the acceptance for the goals / policies and the assessment of their realization on the part of the local community /evaluation of processes implemented by the administration/ survey of staff attitudes is not conducted regularly while the obtained information is analysed and used as basis for improvement.		
	Level 1	There are tools allowing to measure the degree of acceptance of the goals / policies and the assessment of their realization by the local community/evaluation of the processes implemented in the administration/ survey of staff attitudes. Research is incidental.		
	Level 0	There are no tools allowing to measure the degree of acceptance of the goals and the assessment of their realization by the local community/ evaluation of the processes implemented in the administration/ survey of staff attitudes.		
Transparency of the achieved results	Level 3	All the information about the efficiency and effectiveness in the realization of strategic goals/ processes and the scope of their modification are generally accessible		Prepared results of the surveys of staff attitudes are available in full for the office employees and external stakeholders
	Level 2	All the information about the efficiency and effectiveness in the realization of strategic goals / processes are generally accessible		Prepared results of the surveys of staff attitudes are available in full for the office employees
	Level 1	Information about the efficiency and effectiveness in the realization of strategic goals /processes are made available following a demand made by stakeholders		Selected information about the outcome of the survey of staff attitudes are communicated to the employees
	Level 0	Information about the efficiency and effectiveness of realizing strategic goals / efficiency and effectiveness of the implemented processes/ results of the conducted research on staff attitudes are not passed on to the stakeholders.		

## 2.2 Research Tools

The next step in the research procedure was to transform the proposed maturity model into a research tool in the form of a survey using a construction similar to that of the self-assessment survey CAF (Common Assessment Framework). In order to limit the margin of error arising from the declarative nature of the conducted research, in respect

of each question examples of evidence were provided which confirmed the existing organizational state. Due to the limited possibility of presenting the tool, the author has shown below an example of the question aimed at evaluating the maturity level in terms of informing stakeholders about the commencement of the formulation of strategic goals by a borough.

**Table 2.** Example of a research question.

Please mark the answer describing the situation in your office	Answer	
Are the potential stakeholders identified before the commencement of the process of preparing a strategy (or the preparation of plans, documents strategic for the borough)? <i>Example of evidence for "YES": documenting the process of preparing a strategy</i>	No	Yes
Are the previously identified stakeholders informed about the commencement of the process of preparing a strategy (or the preparation of plans, documents strategic for the borough)? <i>Example of evidence for "YES": filed announcements, official correspondence</i>	No	Yes
Are the ways of informing and the information channels adapted to the specific requirements of the groups of the informed stakeholders? <i>Example of evidence for "YES": filed announcements, official correspondence</i>	No	Yes
Are there conducted any actions aimed at the assessment of the efficiency of the applied information channels, and are the conclusions drawn from the assessment used in order to improve communication with stakeholders in the process of preparing a strategy (or the preparation of plans, documents strategic for the borough)? <i>Example of evidence for "YES": reports from the conducted research, documents from the process of communication.</i>	No	Yes

Other questions aimed at assessing individual areas have a similar structure.

In order to increase veracity of the replies, in survey were examples of each organizational condition.

The object of the study were local government administration offices. A computer-aided telephone interview (CATI) was selected as the research method, in which the respondents were Chief Executives of local administration offices, i.e. persons who are best informed in the matters of the functioning organizational solutions in a given administration. The survey was conducted in 2017 (pilot scheme) and 2018 (the research proper).

### 2.3 Structure of the Research Sample

The subject of the conducted research were the offices of local administration, of which 410 were questioned. In the sample of this size and for the assumed level of trust of

0.95, the maximum statistical error amounted to 4%. The choice of trial subjects was of the random-quota nature. Using the criterion of quota selection, due to the character of a borough represented by the office (rural, urban-rural, municipality, town with county rights), the obtained deviations of the trial structure in relation to the structure of local administration in Poland were at the level lower than 3 percentage points for each of the categories, and the value of the similarity index of structures ( $\omega_p$ ) reached 0.976.

### 3 Results

The results obtained from the research procedure are presented in Tables 3, 4 and 5. When comparing the outcomes in the individual areas, one should note the relatively high level of maturity regarding the adaptation of the area of strategy to the principles of good governance. Next in respect of the maturity level is the management of human resources, while the lowest values are recorded in the area of managing processes.

#### 3.1 Strategy

Within the scope of shaping strategy we should draw attention to the high level of maturity regarding transparency of planning and preparing solutions. There are a few reasons for such a state of affairs. Firstly, the offices of local government in Poland are legally obliged to create documents of a strategic character in the areas indicated by the legislature, among which there are: spatial planning for a borough, environmental protection, waste management, and solving social problems. This obligation, combined with the implementation of the statutory access to public information, produces very good results in regard of the maturity of preparing plans and their subsequent availability.

**Table 3.** Level of maturity of local administration in the scope of shaping strategy according to the principles of good governance.

	Level	Level	Level	Level	A	CV
	0	1	2	3		
Transparency of planning	13%	8%	47%	31%	1.97	48.8
Identification of stakeholders' needs	54%	0%	30%	15%	1.08	112.1
Participation in planning	31%	4%	61%	4%	1.38	70.0
Transparency of the prepared plans	1%	4%	67%	28%	2.21	26.1
Assessment of efficiency and effectiveness	73%	1%	14%	12%	0.66	169.3
Accountability (public control)	83%	1%	11%	4%	0.36	231.1
Transparency of the results	74%	16%	1%	9%	0.44	201.3
Average value					1.16	45.5

The assessment of the principle of participation is connected with the two suggested aspects. First is the identification of stakeholders' needs. In this instance more than half of the offices of local administration declare the absence of tools prepared to identify the needs, and the lack of any related research. Those who declare conducting activity in this scope, decidedly more frequently (30%) confirm their irregular character. Only 15% of the studied institutions declare the cyclical nature of the conducted research and drawing conclusions on such basis.

The second aspect of evaluating the implementation of the principle of participation is linked to the possibility of stakeholders' participation in making decisions of a strategic character. The level of maturity in this area most frequently declared by the officials (61% of the offices) means the possibility of the stakeholders' participation in the process of preparing strategic documents, and of contributing their comments related to the prepared documents and/or decisions. Moreover the majority of local government administration declares that the opinions expressed by stakeholders are taken into account when making decisions although they are not of a decisive nature.

A significantly lower level of maturity has been identified in the case of using the evaluation tools for actions of a strategic character. Regarding the internal mechanisms for assessment (measuring the effectiveness and efficiency in implementation of strategic goals) almost three quarters of the offices confirmed the lack of implemented tools which enable measuring the realization of strategic goals. In the remaining cases, when such measurement was made it was rather of a sporadic nature (14%) than a constant and systematic practice (12%). Similar, although on an even lower level, are the results obtained in the area of assessment of the realized goals made by the local community (as the implementation of the principle of accountability). In this instance only 16% of the offices implemented mechanisms allowing to gather information on the degree of acceptance by stakeholders for the strategic actions realized by their borough, while merely 4% of the offices conduct regularly research of this type.

The level of transparency regarding efficiency and effectiveness in the realization of strategic goals is directly related to the usage of measuring tools (the value of the Spearman coefficient of correlation between the level of maturity in the scope of evaluating efficiency and effectiveness, and the availability of information about the achieved results equals 0.94). Naturally it is impossible to divulge information which is not gathered, however it is worth noting that in the situations when the administration obtained information regarding the efficiency and effectiveness of the implementation of strategic goals, it is not generally available but is passed on to the stakeholders only when specifically asked for (the situation is reverse in the case of transparency of the set out strategic goals).

### **3.2 Processes**

The other research area, i.e. maturity in managing processes in accordance with the principles of good governance, shows the lowest average level of advancement of the applied solutions. This is related to the low level of the orientation on processes on the part of the questioned officials in the local administration. In the research sample only in 42% of cases the implemented processes were identified, and they were mapped out

in 34% of the offices. Such a situation leads to a relatively weak diversification of results at the level of the average evaluation made from the viewpoint of the adaptation of this field to the individual principles of good governance.

For the proposed model of evaluation the highest results were obtained in the aspect related to the transparency of mapping out processes (identification and providing information for stakeholders) and revealing information on carrying out processes.

**Table 4.** Degree of maturity of the offices in the scope of shaping processes in accordance with the principles of good governance.

		Level 0	Level 1	Level 2	Level 3	A	CV
Processes	Transparency of planning	69%	3%	15%	13%	0.72	158.3
	Identifying stakeholders' needs	82%	0%	11%	7%	0.43	216.9
	Participation in planning	81%	1%	17%	1%	0.38	210.3
	Transparency of processes	70%	15%	5%	10%	0.55	177.7
	Assessment of efficiency and effectiveness	89%	0%	6%	5%	0.27	288.1
	Accountability (public control)	83%	0%	11%	6%	0.40	225.4
	Transparency of the results	91%	6%	0%	3%	0.15	363.1
	Average value					0.41	144.8

The offices which implemented the process approach more frequently conduct research regarding the identification of stakeholders' needs and the assessment of the implemented processes than make use of the internal mechanisms for assessing the efficiency and effectiveness of the implemented processes, which are based on the measures established for processes in respect of their cost and the degree of realization of the set goals. Just as in the case of the area of strategy, this has a significant influence on the transparency of the achieved results.

### 3.3 People

In regard of the average value of the assessment of maturity in the application of the principles of good governance, in the scope of human resources management the results were lower than in the case of strategy. An analysis of the results obtained in this area shows, just as with strategy, the high assessment of the studied offices in relation to transparency of planning. Surprisingly, the needs of employees regarding the desired solutions are quite rarely identified, in as many as 82 % of cases such practice does not exist. When such information is actually obtained, it does not occur on a regular basis.

Participation, understood as the input of employees in the preparation of strategies and solutions HRM, exists on a fairly low level. In 60% of the offices, employees do not participate in the process of shaping personnel function, while in 37% of cases it is possible for the staff to participate and to postulate but without any binding power. The transparency of the prepared solutions also remains quite low since in 44% of the cases they are not communicated to the employees.

**Table 5.** Degree of maturity of the offices in the scope of shaping personnel function in accordance with the principles of good governance.

	Level 0	Level 1	Level 2	Level 3	A	CV
Transparency of the prepared solutions	25%	9%	34%	32%	1.73	66.9
Identification of stakeholders' needs	82%	1%	11%	6%	0.42	219.8
Participation in planning	60%	1%	37%	2%	0.81	124.1
Transparency of the prepared plans	44%	20%	27%	10%	1.02	102.5
Assessment of efficiency and effectiveness	7%	8%	10%	75%	2.54	35.7
Accountability	80%	0%	8%	12%	0.51	206.8
Transparency of the results	81%	8%	10%	0%	0.29	222.7
Average value					1.02	47.8

The high level of maturity in respect of applying the tools for assessing the efficiency and effectiveness of human resources is linked to the usage of the system of periodical assessment, including the evaluation of individual effectiveness of employees, declared by these offices, 75% of which also report using the system of periodical evaluation for the purposes of improving their human resources management.

Accountability in the case of HRM is directed at the organization internally, therefore the HR solutions should be judged through conducting the job attitude study. The use of job attitude study in the process of human resources management was declared by 20% of the offices, whilst 12% confirmed constant and systematic practices in this scope. Almost all the units which implement the surveys of employee attitudes declare revealing in part (8%) or as a whole (12%) the results of such research, which are however made available only to their own staff and not to the external stakeholders.

#### 4 Discussion and Conclusion

The presented research results allow to formulate a conclusion about the diversified level of the adaptation to the concept of good governance on the part of the local government offices in Poland. The highest level of the adaptation can be observed in the area of shaping strategy. This applies in particular to transparency, which to a large degree results from the legal conditions. Documents which are strategic for a borough (e.g. the strategy and development plans for a borough, plans for spatial development, programmes for a borough, strategy for solving social problems) require the participation and the approval (confirmation) of an organ of local government such as the local council, and according to Art. 61 act 1 of the Polish constitution every citizen holds the right to obtain information about the activities of public authority organs and persons performing public functions. Thus the high level of maturity for transparency in that scope (in particular regarding the access to information about the existing solutions) is completely understandable and resulting from the legal regulations.



The way of shaping organizational solutions in the other two areas (processes and HMR) is to a higher degree regulated by the offices of local administration, hence probably their lower average indices (in particular in the area of managing processes). Nevertheless, when analysing the scale of adaptation of the transparency measure in these areas it can be observed that transparency regarding the planned and the existing management solutions remains at a relatively high level.

In the scope of participation, which in the proposed model consists in the identification of stakeholders' needs and in ensuring their participation in the process of shaping strategies and organizational solutions, we should indicate the more frequently declared by the officials possibility of stakeholders' participation in preparing solutions rather than the identification of those needs with the use of the tool of the public opinion survey. Such an observation does not refer to the area of managing processes where the diversification of the maturity levels of the individual principles of good governance is significantly lower.

We should also note the very low degree of adaptation in regard of the applied measures of efficiency and effectiveness in the area of strategies and processes. This observation does not refer to the area 'people' in which legal regulations demand carrying out employee appraisals, which strongly influences the applied practices.

The lowest degree of adaptation relates to the transparency of results and accountability. In the case of transparency of the results this is connected with the previously indicated lack of measurement tools. The activities in all the studied areas are also rarely the subject of the stakeholders' scrutiny. This in turn leads us to the conclusion about the low level of organizational maturity of these offices in terms of accountability.

The conducted research aimed at identifying the levels of maturity in the offices of local government in relation to their adaptation to the concept of good governance, has shown above all that in the studied administration the degree of adaptation is primarily influenced by legal regulations, and the offices demonstrate only a very small degree of their own initiative in the improvement of areas which are not regulated by the existing legal requirements.

It also seems justifiable to conduct further research aimed at the verification of the potential links between the degree of maturity of local government administration and the satisfaction of the stakeholders.

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## Investment Outlays on the Development of the Collective Sewage System of the Village - Selected Problems

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**Abstract.** The article presents changes in investment outlays in environmental protection, with particular focus on investment outlays incurred on the sewage system of rural areas in Poland in years 2012-2016. The analysis of changes in these investment outlays according to investment directions (such directions as: collective water supply, collective sewerage, collective sewage treatment plants, individual rural sewage treatment plants, landfills) and sources of financing (from the state budget, local governments, rural residents, funds environmental protection and water management, structural funds of the European Union, others, for example EcoFund). The research covered the structure of investment outlays on the sewage system of the village both nationally and in the voivodeship section. The importance of EU structural funds for improving the sanitary condition of the village was emphasized. The most important effects of investment outlays in the development of water supply and sewage networks were presented, including: the increase in the length of collective water and sewage systems, increase in the number of sewage connections to residential and commercial buildings and improvement of the unfavorable relation of the collective length of the water supply network to the length of the sewage system.

**Keywords:** Investment Outlays, Collective Sewage System, Polish Countryside.

### 1 Introduction

The sewerage network is an important element of the technical infrastructure that affects the state of the natural environment. The developed sewage network and associated with such devices and technical infrastructure facilities, such as: water supply network and sewage treatment plants - affect the improvement of the standard of living of inhabitants of rural areas.

Equipping the village with technical infrastructure, including a collective sewerage network, should stimulate multifunctional agricultural development and sustainable development of rural areas [2, 5, 7, 9].

Underdevelopment of water and wastewater management is recognized as one of the most serious barriers to rural development in the European Union. For many years, the Polish village was underinvested in technical infrastructure, including a sewerage system. Quite often, the water supply network functioned without a sewage system. The septic tanks for collecting sewage (septic tanks) were in a great part in poor technical condition [3, 6, 8].

The presence of Poland in the structures of the European Union requires solving the problems of water and sewage management in rural areas (Water Framework Directive). In particular, European Union Structural Funds serve this purpose [1, 5].

However, using their resources requires own contribution. In the case of communes with relatively small budgets, capital-intensive investments are forfeited, for example the development of a sewage system. This is not conducive to the implementation of the idea of sustainable development in rural areas.

The aim of the article is to assess the effects of investment outlays on the development of a collective sewage system in rural areas in Poland in the cross-section of voivodeships.

## **2 Methods in Data Source**

The article uses the method of data analysis with the use of universal statistics. Selected items from the subject literature, specialist studies and general statistics data were used in the preparation of this study, which are published in the statistical yearbooks titled Environmental Protection.

## **3 Structure of Outlays**

Investment outlays on environmental protection and water management include outlays:

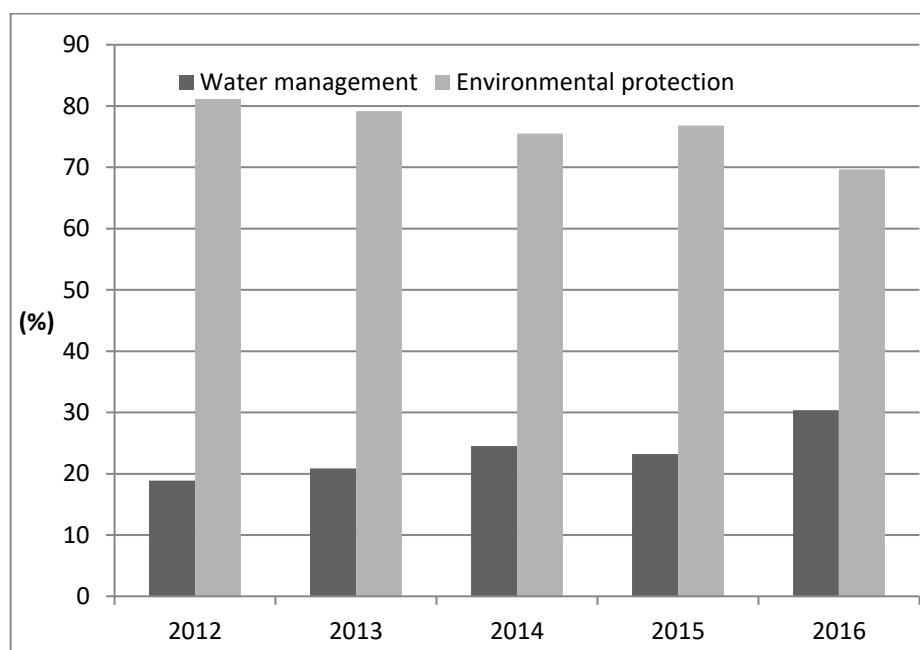
- financial or material, the purpose of which is to create new fixed assets or improve (reconstruction, extension, reconstruction, adaptation or modernization) of existing fixed assets,
- as well as outlays on the so-called first investment equipment. These outlays do not increase the value of fixed assets [4].

Investment outlays on the creation of new fixed assets, improvement of existing fixed assets and the first equipment for investments to protect the environment in the Polish countryside in the years 2012-2016 constituted the vast majority of investment outlays, which were allocated for this type of investments for environmental protection and water management in rural areas in Poland (see Fig. 1). On average, 76.4% of the total investment outlays analyzed fell on these outlays annually. Such a division resulted from the need to improve the poor sanitary condition of the village in Poland [7].

In total investment outlays on environmental protection and water management in the Polish countryside during the period under consideration (in the years 2012-2016), one can observe:

- a decrease in the share of investment outlays for environmental protection, to 69.6% (by 11.5 percentage points, respectively);
- increase in the share of investment outlays on water management, up to 30.4% (see Fig. 1).

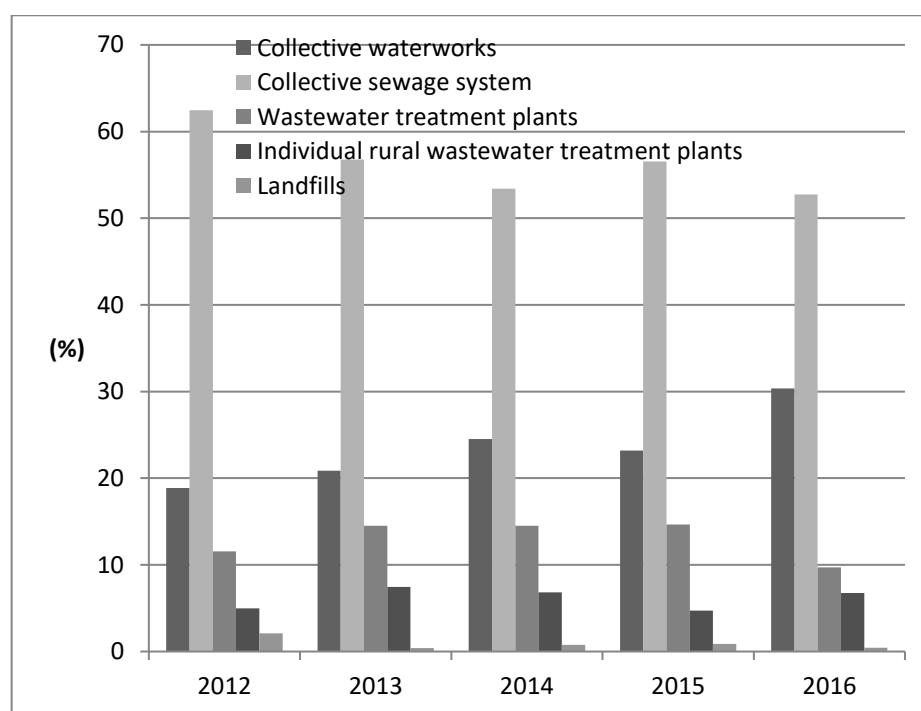
This phenomenon was influenced by many different factors, one of the most important is the relatively high capital intensity of investments in the field of environmental protection (for example, the development of a sewage system linked to a sewage treatment plant operating on this network).



**Fig. 1.** Structure of investment outlays for environmental protection and water management in rural areas in Poland in the years 2012-2016 (%) [7].

Analyzing the structure of total investment outlays on environmental protection and water management in the Polish countryside in the years 2012-2016, it should be noted that relatively the most were allocated to the development of a collective sewage system (on average 56.4% each year), relatively much for the development of the collective water supply network (23.6% respectively). The smaller share in the total investment expenditures for the creation of new fixed assets, the improvement of existing fixed assets and the first equipment for investments to protect the environment and water management in the Polish village had - in descending order - financing for development: collective sewage treatment plants (13%), individual rural sewage

treatment plants (6.1%) and landfills (0.9%) (see Fig. 2). Such distribution of outlays resulted from the need to alleviate the disproportion between the length of the collective water and sewage network, and ultimately to eliminate differences in this area. Detailed results are presented in the further part of this study.



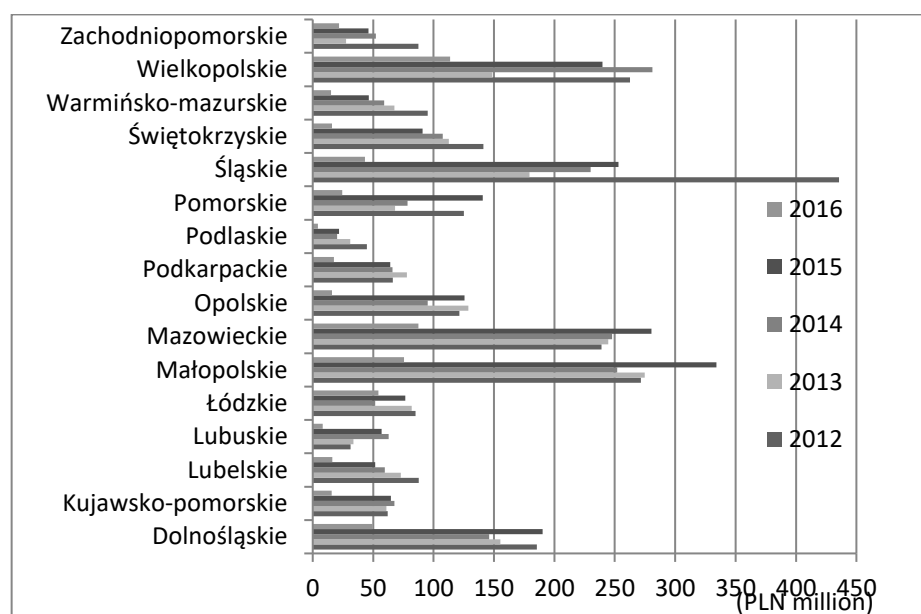
**Fig. 2.** Structure of investment outlays for environmental protection and water management in rural areas in Poland in 2012-2016 by investment directions (%) [7].

Analyzing investment outlays on the sewerage system in the Polish countryside according to voivodships, it should be noted that in the initial period under consideration, the most were allocated to them in the Śląskie Voivodeship (PLN 435.7 million, it is 18.6% total financial resources), less in voivodeships: Małopolskie Voivodeship (PLN 271.5 million, respectively – 11.6%), Wielkopolskie Voivodeship (PLN 262.5 million, 11.2%), Mazowieckie Voivodeship (PLN 239 million, 10.2%), Dolnośląskie Voivodeship (PLN 185.6 million, 7.9%), Świętokrzyskie Voivodeship (PLN 141.2 million, 6%). The six mentioned voivodeships fell two thirds of all these outlays, the remainder of them (one third of total investment outlays for a combined sewerage system in the Polish countryside) has been spread (in the range from PLN 125.1 million to PLN 31.2 million) on 10 provinces. The relatively least-analyzed outlays were incurred in the Lubuskie Voivodeship (PLN 31.2 million, 1.3%) (see Fig. 3).

In the year 2016, compared to the year 2012, the volume of total investment outlays earmarked for the development of a combined sewerage system in the Polish rural area

decreased significantly (to PLN 579 million, about PLN 1763.1 million). An analogous phenomenon occurred in all voivodeships, but with varying intensity (see Fig. 3).

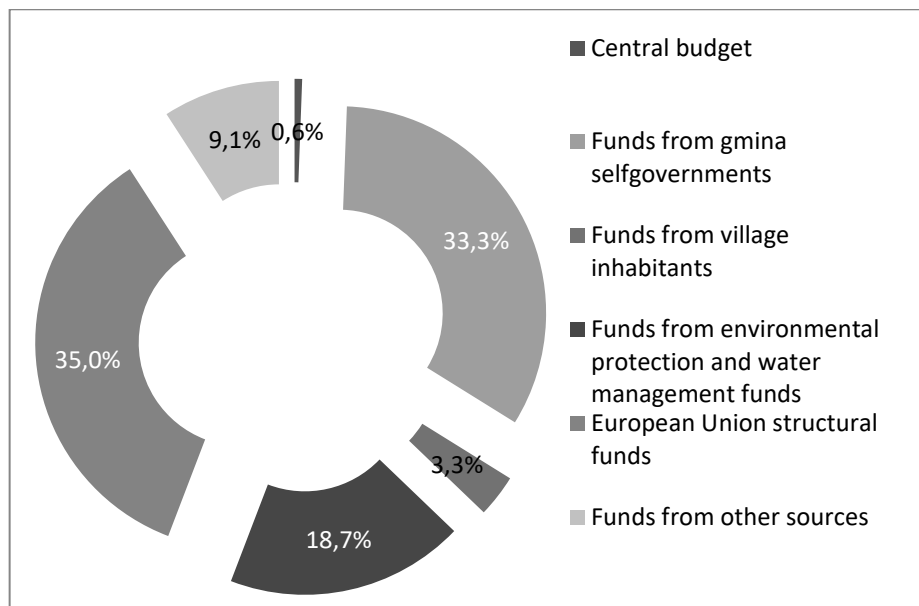
At the end of the period under consideration (in the year 2016) the most investment outlays for the development of collective sewage system in the countryside were allocated in the Wielkopolskie Voivodeship (PLN 113.6 million, i.e. less about 56.7% less than in the year 2012), relatively much in the provinces - in order of descending order: Mazowieckie Voivodeship (PLN 87.6 mln zł, less about 63.4%), Małopolskie Voivodeship (PLN 75.5 million, less about 72.2%), Łódzkie Voivodeship (PLN 54.3 million, less about 36.2%), Dolnośląskie Voivodeship (PLN 49.7 million, less about 73.2%), Śląskie Voivodeship (PLN 43.3 million, less about 90.1%). In the analyzed period (year 2016), the said voivodeships fell two thirds of all these outlays, the remaining part (one third of total investment outlays for a combined sewage system in the Polish countryside) has been spread (in the range from PLN 24.5 million to PLN 4.3 million) on 10 voivodeships. The relatively least-analyzed outlays were incurred in the voivodeship podlaskie (PLN PLN 4.3 million) (see Fig. 3).



**Fig. 3.** Investment outlays on the collective sewage system in the countryside in Poland in 2012-2016 by voivodeships (PLN million) [7].

In investment outlays for the development of a collective sewerage network in rural areas in Poland in the years 2012-2016, the largest share was held by funds from structural funds of the European Union (on average per year 35%), only slightly smaller funds of local governments (respectively – 33.3%), funds for environmental protection and water management (18.7%) and other funds had already had a smaller share (9.1%);

this group includes funds from, for example, the EcoFund, Financial Mechanisms or the Swiss-Polish Cooperation Program. Definitely less important in the analyzed area were funds spent by rural residents (on average per year – 3.3%), and especially from the state budget (respectively – 0.6%) (see Fig. 4).

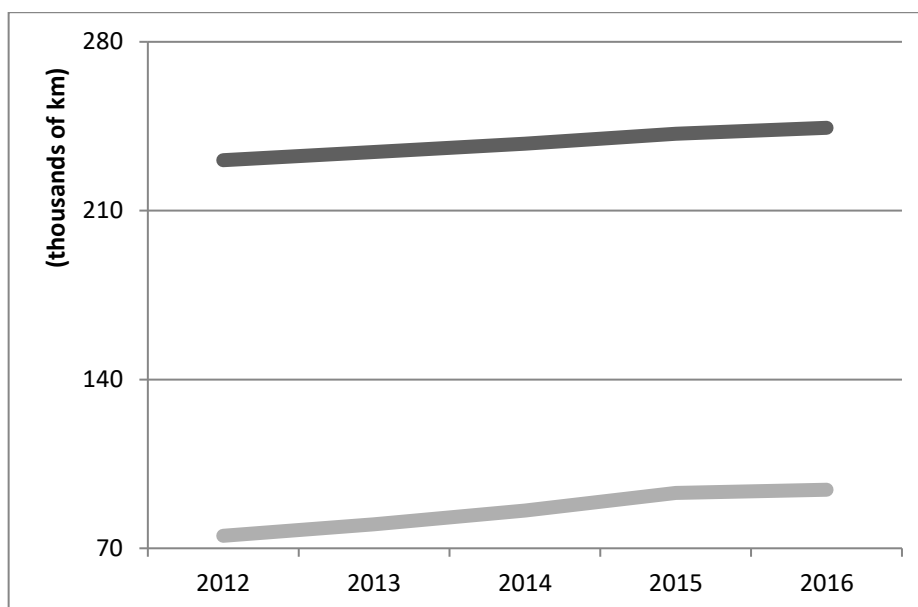


**Fig. 4.** The average annual structure of outlays for collective sewerage in rural areas in Poland in the years 2012-2016 by sources of financing (%) [7].

#### 4 Material Effects

As a result of capital expenditures incurred on the development of the collective sewerage network in rural areas in Poland, in the years 2012-2016, the total length of this network increased, among others. At the end of the year 2016, it was 94275.9 km and she was longer about 19084.5 km longer than in the year 2012 (see Fig. 5).

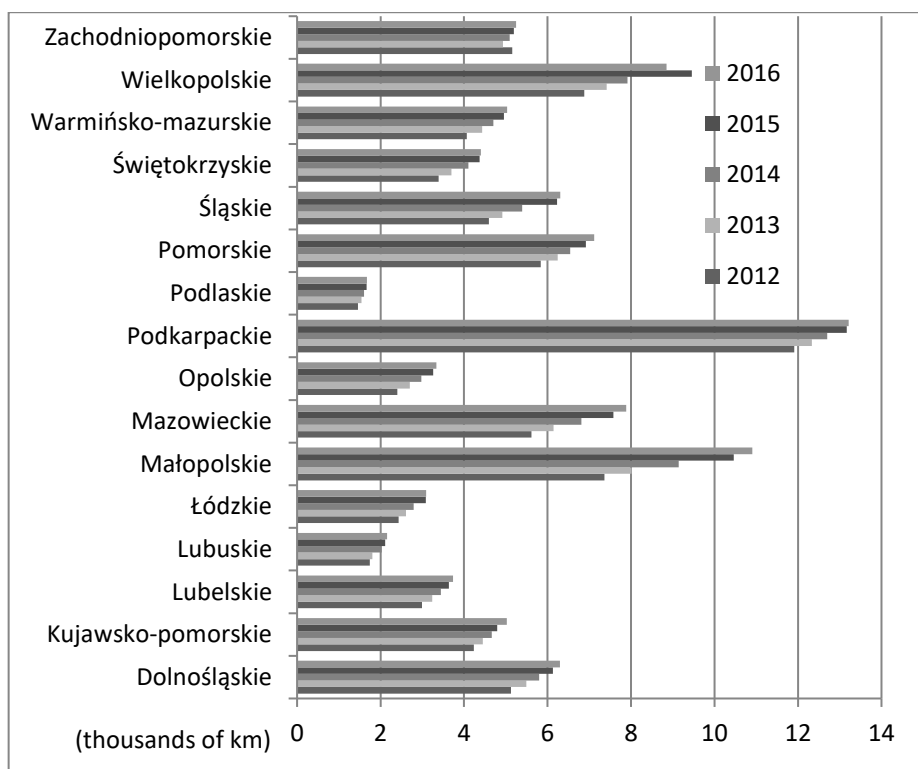




**Fig. 5.** Length of collective water supply and sewage networks in the whole country in Poland in the years 2012-2016 (thousands of km) [7].

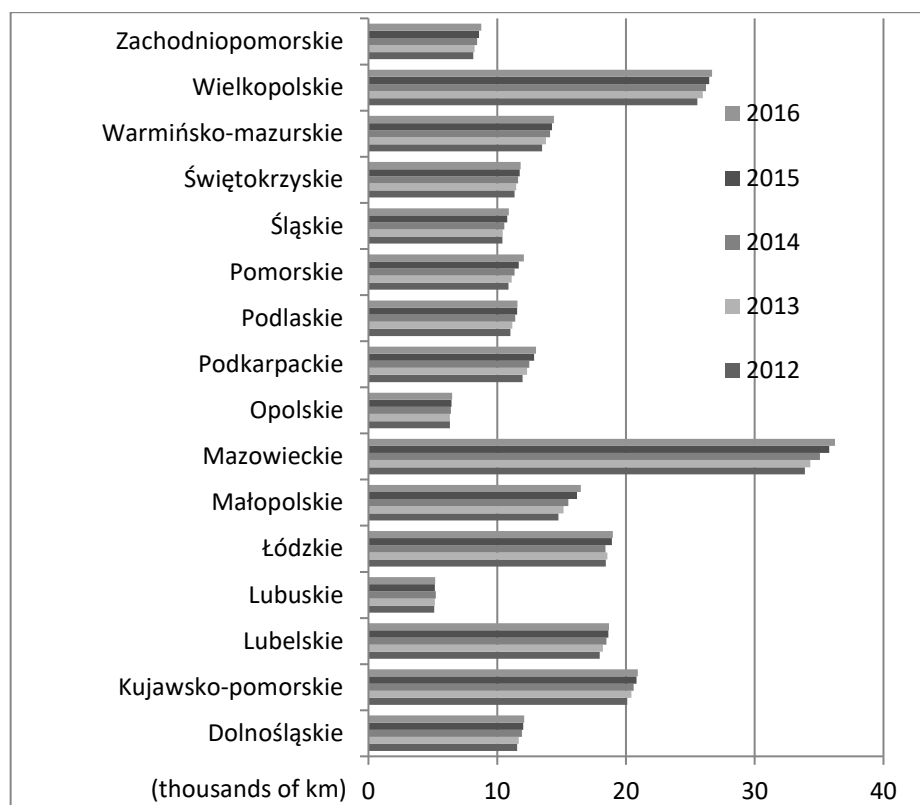
An analogous phenomenon occurred in all voivodeships, but with varying intensity (see Fig. 6). The relatively most dynamic length of the collective sewerage network increased in the villages of the Małopolskie Voivodeship (up to 10905.8 km, this is about 48.16%). In terms of the length of this network, the voivodeship occupied the second place in the ranking of voivodeships in the year 2016 (also in the initial period under consideration). The least dynamic length of the collective sewerage network increased in the year 2016 compared to the year 2012 in the villages of the Zachodniopomorskie Voivodeship (up to 5151.3 km, respectively about 1,87%), what classified the village of this province in the eighth place in the same ranking.

Due to the dynamics of the increase in the collective length of the sewerage network in the countryside (in the year 2016 and in relation to the year 2012), you can rank the voivodships as follows: Zachodniopomorskie Voivodeship (increase about 1.87%), Podkarpackie Voivodeship (increase about respectively 10.94%), Podlaskie Voivodeship (14.68%), Kujawsko-pomorskie Voivodeship (18.58%), Pomorskie Voivodeship (21.86%), Dolnośląskie Voivodeship (22.82%), Warmińsko-mazurskie Voivodeship (23.80%), Lubuskie Voivodeship (23.94%), Lubelskie Voivodeship (24.83%), Łódzkie Voivodeship (27.33%), Wielkopolskie Voivodeship (28.65%), Świętokrzyskie Voivodeship (29.81%), Śląskie Voivodeship (37.35%), Opolskie Voivodeship (38.73%), Mazowieckie Voivodeship (40.51%), Małopolskie Voivodeship (48.16%) (see Fig. 6).



**Fig. 6.** Length of the collective sewerage network in the countryside in Poland in the years 2012-2016 by voivodeships (thousands of km). [7].

In the corresponding period, the length of the collective water supply network in the villages in Poland also increased 244355.9 km in the year 2016 (about 13434.7 km compared to 2012) (see Fig. 5). An analogous phenomenon occurred in all voivodeships, but with varying intensity (see Fig. 7).



**Fig. 7.** Length of the collective water supply network in the countryside in Poland in 2012-2016, by voivodeships (thousands of km) [7].

The relation of the collective length of the water supply network to the length of the collective sewerage system has improved. In the initial period under consideration (in the year 2012), the relation of the length of the collective water supply network to the length of the collective sewerage network in the Polish village was as: 3,07 to 1. This means that the collective water supply network was over three times longer than the collective sewerage network. At the end of the year 2016, the analyzed relationship was shaped more favorably than: 2,59 to 1.

Among the analyzed voivodeships, the relatively most advantageous relation of the collective length of the water supply network to the collective sewerage system in the countryside at the end of the analyzed period (2016) occurred in Podkarpackie Voivodeship (0,99 do 1), and the least favorable was in the rural areas of the Podlaskie Voivodeship (6,92 do 1). In terms of the analyzed relationship, the following series of provinces was formed: Podkarpackie Voivodeship (0,99 do 1), Małopolskie Voivodeship (1,51 do 1), Zachodniopomorskie Voivodeship (1,67 do 1), Pomorskie Voivodeship (1,69 do 1), Śląskie Voivodeship (1,73 do 1), Dolnośląskie Voivodeship (1,92 do 1), Opolskie Voivodeship (1,95 do 1), Lubuskie Voivodeship (2,40 do 1), Świętokrzyskie Voivodeship (2,69 do 1), Warmińsko-mazurskie Voivodeship (2,86 do

1), Wielkopolskie Voivodeship (3,02 do 1), Kujawsko-pomorskie Voivodeship (4,17 do 1), Mazowieckie Voivodeship (4,60 do 1), Lubelskie Voivodeship (5,00 do 1), Łódzkie Voivodeship (6,13 do 1), Podlaskie Voivodeship (6,92 do 1).

The lack of full coverage of the water supply network with the sewage system should be compensated by hermetic (technically efficient) septic tanks (septic tanks), which must be emptied regularly, in accordance with the relevant legal regulations. From the literature, however, it appears that such a procedure is not always the case. Some of these types of tanks are leaking. Not all of them are regularly pumped out by specialized equipment and their contents are exported to a sewage treatment plant. Some percentage of liquid waste (sewage) gets through the tank (cesspool). Sewage is seeping into the ground (into groundwater), which causes contamination of the natural environment [4, 8]. As a result, it threatens health and even human life.

## 5 Summary

Investment outlays on the development of a collective sewerage network in the countryside had the largest share in outlays on environmental protection in the Polish countryside in the years 2012-2016. This situation has been maintained since Poland's accession to the European Union and results from the need to improve the sanitary condition of the village.

European Union structural funds are a very important source of financing the development of a collective sewerage network in the countryside. In the audited period (in the years 2012-2016) from these funds the most funds were spent on the analyzed objectives, only slightly less funds came from budgets of local governments. Less significant in financing the development of the collective sewerage network in the countryside had resources that were spent from environmental protection and water management funds and from other sources (for example from the EcoFund). Residents of the village had a relatively small share in financing the development of a collective sewerage network in the area in which they live. The least important in financing the analyzed investments was expenditures expended from the state budget, which had a more significant role before Poland's accession to the European Union.

The material effects of the outlays incurred on the development of the collective sewerage system in the countryside were, in particular: an increase in the length of the sewerage system, an increase in the number of sewage connections to residential and commercial buildings, and an unfavorable relation of the collective length of the water supply network to the length of the sewage system.

The lack of full coverage of the water supply network with the sewerage system in the countryside is a premise for further capital outlays on the development of the sewerage network. In the absence of technical capabilities to build or expand a collective sewerage network or an exceptionally high capital-intensive nature of such investments, the construction of septic tanks for wastewater collection should be financially supported. The tanks of this type (septic tanks) already in operation must be systematically controlled in terms of their technical efficiency, their tightness is very important.

The development of the village sewerage system, and more broadly the improvement of water and sewage management in the countryside results from the Framework Water Directive adopted by Poland, the aim of which is to greening the village within the European Union. Such activities should be considered as a path leading to socially, economically and environmentally sustainable (ecological) development of rural areas of the European Union.

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## Motivation of Academic Staff at Universities in the Czech Republic: Qualitative Research

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**Abstract:** The subject and question of motivation of people in general and employees in particular are a well-known issue in the society and have been examined by many researchers. To develop the third pillar of public higher education, it is necessary to motivate academic staff to generate interesting R&D results in various ways. Financial incentives are not always the most important factor that drives forward the work of academic staff in various fields. Other factors may take precedence over finances and become the most significant motivator of our work. In our qualitative investigation, we explored precisely this question and analysed which fields of research across different public institutes of higher education are supported the most and above all by which factors of motivation. We conducted qualitative interviews with representatives of public universities and the Academy of Sciences, who hold a range of managerial positions in a range of different fields. The results we arrived at confirmed our assumptions and also showed which fields consider financial incentives, working facilities and conditions, and rules and policies as significant factors.

**Keywords:** Motivation, Academic Staff, Czech Republic, Public Universities.

### 1 Introduction

Based on relevant literature, factors of motivation can be generally divided into three main groups, that is, individual prerequisites, work factors and conditions, and conditions of the working environment. These three main groups of factors are closely related and together have a strong influence on the motivation of individuals. According to [2, 3], individual prerequisites include the abilities of each employee consisting in their knowledge and skills, morale, initiative, creativity, commitment as well as family background. Further influences are attitudes to oneself, one's work, and the workplace situation, the need for security and social needs, and, last but not least, the need for self-actualisation and level of motivation. Shaheen et al. [5] state that within the theoretical framework for motivating employees, internal factors of individual employees must be supported through academic policy and adequate conditions must be created.

Some studies show [1,4-6] states that work factors and conditions are created as background by each institution for its employees and the background is the same for everyone: technological conditions, workplace equipment, management style, work organisation and method of work evaluation, employee benefits, possibility of career advancement, monetary and non-monetary remuneration, rational (content) and emotional (experience) communication.

Characteristics of work environment include in particular the immediate work environment, co-workers and superiors, the overall organisation climate and workplace relationships, a broader system of requirements and control of their fulfilment, individual requirements, the employer's interest in and care of working conditions, recognition of and reward for one's work, fairness and equal treatment.

## **2 Methodology**

In order to examine the remuneration of authors, we created a qualitative research questionnaire according to Hendl [2], which was composed of two distinct parts. The first part was designed as introductory and informative. There were free questions, where the respondents recorded answers about their gender, field of research, achievement of research results and information whether or not they were granted industrial property rights for any of their results.

The second part of the questionnaire was divided into four thematic areas, whose main intention was to identify the main motivators of research and academic staff working at research institutes and public universities. The first thematic area focused on working conditions and factors that directly or indirectly affect or may affect their work performance. The second thematic area focused on the characteristics of the working environment and the facilities available at the workplace. This section also included questions related to industrial property rights and the office of transfer of technologies and its activities. The third area focused on individual attitudes of employees towards their own abilities and knowledge, satisfaction with their own results, and whether their job is sufficiently satisfactory, also with respect to its recognition and appreciation. The fourth and final section of this part of the questionnaire consisted of a single question, where research and academic staff were asked to state what they regard as meaningful work at university. In the second part of the questionnaire, the respondents recorded their answers using a six-point scale, where 1 indicated a negative answer and 6 an affirmative answer. To evaluate the second part of the questionnaire, we compared the answers using the arithmetic average, which is a statistical quantity expressing in a sense a typical value describing a set of many values.

We recorded the results obtained from the respondents in tables, one for each research field, and then calculated the above-mentioned arithmetic mean for each

questionnaire question. As to evaluation, we proceeded to evaluate the results by research field.

For verification, we selected a structure of faculties of diverse universities varying in their main research fields and the Czech Academy of Sciences, where offices of transfer of technologies have been established for different lengths of time. We believe that this constitutes a significant representative sample of this qualitative study. In total, we included seven different institutions: University of South Bohemia in České Budějovice, Masaryk University in Brno, Technical University of Ostrava, Czech Technical University, Palacký University in Olomouc, University of Hradec Králové, and the Institute of Animal Sciences.

The research was conducted between July 2017 and April 2018. Respondents were gathered by the proven method known as snowball. The respondents were given individual time to consider the topics which were included in the questionnaire and subsequently discussed and consulted.

As to the structure of the respondent sample to be investigated, we approached research and academic staff who generate results applicable in practice, have experience of cooperating with companies or have commercialised their results in the market either through offices of transfer of technologies or on their own. Gender representation was fairly balanced (56% male, 44% female). Participants were researchers of all ages.

Age groups over 30 years were represented quite evenly, although there were fewer respondents aged between 30 and 35 and then 60 and more.

Respondents serving as department heads, rectors, deans, and vice deans were evenly represented. By far the largest proportion of the sample was then made up of academic staff.

## **2.1 Data Processing (Applied Methods, Formulas, Software)**

To evaluate the questionnaire, we used descriptive statistics, that is, descriptive methods to display the collected values. More specifically, we used the measure of location – the arithmetic mean. We used the arithmetic mean although we are aware of its sensitivity to changes in the values of the sample, especially the possibility of an extremely deviated value. The arithmetic mean is characteristic of its convergence with the increasing extent of the sample and usually also a fast convergence of average probability distribution and normal distribution. We used MS Excel for a graphic display of data.

## **3 Questionnaire Survey Evaluation**

The seven institutions participating in the survey were represented by a total of nine different disciplines. The humanities were represented by faculties of law, theology,



economics, and health and social studies. Natural sciences were represented by faculties of agriculture and fisheries and by chemistry disciplines. Engineering was represented by disciplines of construction engineering, physics, and computer sciences.

What was interesting was also the representation of respondents with respect to their job roles. The vast majority was represented by academic staff, as illustrated in figure 1 below. Also of interest with respect to the qualitative questionnaires was the representation of respondents holding the posts of department heads, deans, vice deans, and rectors. It should also be added that one of the respondents, whose highest achieved academic title is that of professor, served as minister of education of the Czech Republic a few years ago.

**Table 1.** Respondents by job role.

Rector	2
Dean	3
Vice dean	4
Head of Department	5
Academic staff	40
Uncategorized	1

As to the comprehensive overview of the highest achieved academic title, by far the largest number of respondents held the PhD degree, followed by the MA and the Docent degrees. There was also a fairly strong representation of the professor title, also represented were the Doctor of Law and the Doctor of Science degrees, and one respondent did not obtain any academic degree as yet.

### **3.1 Working Conditions and Factors Influencing Work Performance**

The first area focused on working conditions and factors affecting work performance and results. Table 2 below shows that among the most satisfied disciplines with respect to their working conditions, motivational incentives, their own results, job duties and workload, and recognition and appreciation on the part of their supervisor are physics and chemistry, followed by fisheries, health and social sciences, and theology. The least satisfied academic staff are in the disciplines of computer sciences and construction engineering, where the results indicate average satisfaction.

When comparing the individual questions for the purpose of interdisciplinary comparison, respondents in all disciplines are satisfied with respect to adequate working conditions and investments in facilities, also opportunities for further education – which are supported at workplaces throughout the disciplines – are evaluated in very positive terms.

Interdisciplinary comparison shows that the respondents are the least satisfied with systematic rewards for performance at their workplaces at universities. The respondents

are not particularly worried about a possible loss of employment. This can be explained by the current shortage of qualified candidates in the job market.

**Table 2.** Evaluation of working conditions.

	Conditions at the workplace	Infrastructure investments	Bonus system	Reward motivates me	Systematic rewards
Theology	5.7	5.7	4.7	4.7	4.3
Health and social	5.5	5.5	4.0	4.5	4.5
Agriculture	5.1	4.3	3.3	3.0	3.1
Construction	4.5	3.0	2.0	3.0	1.5
Fishery	6.0	6.0	5.7	5.7	4.3
Physics, chemistry	5.5	5.2	4.6	4.7	4.5
Informatics	5.2	4.3	2.8	3.0	1.7
Economy	4.4	4.4	4.4	3.8	4.0

### 3.2 Workplace Facilities and Infrastructure

Results of the second thematic area, which focused on the characteristics of the working environment and the facilities available at the workplace, are shown in table 3.

With respect to transparent conditions, goals and tasks, and the fulfilment of specified requirements, the most satisfied disciplines are health and social sciences, followed by physics, chemistry, and fisheries. The least satisfied respondents in this respect were in the discipline of computer sciences. Within the disciplines, it is apparent that the respondents are overall satisfied with the laboratory equipment and the transparency of requirements on the part of their supervisors, as well as with the individual tasks and goals, which the employees consider meaningful.

**Table 3.** Workplace facilities.

Averages	Transparent principles	Meaningful goals	Employees satisfaction	Know supervisor requirements	Laboratories quality	Administrative support
Theology	2.0	5.3	4.3	5.7	4.7	5.7
Health and social	5.0	5.5	5.0	5.5	5.5	5.0
Agriculture	3.1	4.6	4.0	4.9	5.3	4.3
Construction	2.0	5.0	4.0	5.5	4.5	2.0
Fishery	3.0	4.0	3.0	3.0	5.3	5.3
Physics, chemistry	4.1	5.1	4.5	5.4	5.3	4.4
Informatics	2.7	3.7	4.3	4.2	4.8	3.5
Economy	3.6	4.4	3.6	5.0	4.2	2.6

Because part of this section was also questions regarding industrial property rights and offices of transfer of technology and their activities, we will now evaluate this specific segment within this thematic area. The respondents report that they are well informed about the existence or non-existence of an office of transfer of technology at their institutes, and it is also apparent that most of the respondents have already dealt with the office, including respondents in the humanities. With respect to the worst-rated aspects of the office of transfer of technologies, the respondents were the least satisfied with the motivational incentives of the office to generate results and secure funding. It must be noted here that raising funds in the area of transfer of technologies or transfer of knowledge must be evaluated in the context of possible available funding schemes, which are few in the Czech and European environment.

The question regarding the motivation on the part of offices of transfer of technologies was the worst rated in this thematic segment. It followed from the interviews with the respondents that employees of offices of transfer of technologies are able to support academic staff with consultations, advice and help with tasks leading to industrial property rights, provided that this step is evaluated as economically efficient, necessary, and suitable. However, motivation in terms of themes or ideas relies mostly on the academic staff themselves because the employees of technology transfer offices do not monitor the progress and developments in science and are not aware of areas and directions of possible further development and research.

### **3.3 Aspects of Internal Motivation**

Aspects of internal motivation focused on individual attitudes of the respondents towards their own abilities and knowledge, satisfaction with their own results, and whether their job is sufficiently satisfactory, also with respect to its recognition and appreciation. Table 4 below shows that overall the most satisfied in this area are respondents representing the disciplines of health and social sciences, closely followed by physics, chemistry, and theology. When comparing the nine disciplines under examination, the least satisfied respondents were in the disciplines of construction engineering and law. Across the disciplines, the highest-ranking question was that regarding creativity, which is highly inspiring, then satisfaction with one's own work, as well as the satisfaction with the achieved results. Overall, it is apparent that the respondents are stable employees who can mostly imagine working at these current positions until the end of their careers, which is true above all for representatives of theology and health and social sciences.

**Table 4.** Factors of motivation.

Average	Work satisfies me	My results are best motivation	Prestige	Skills are used
Theology	5.7	5.3	5.3	5.7
Health and social	5.5	6.0	5.5	5.5
Agriculture	4.8	4.7	4.6	4.5
Construction	4.5	4.0	4.0	4.5
Fishery	5.3	6.0	6.0	3.7
Physics, chemistry	5.6	5.7	5.4	5.5
Informatics	4.8	4.5	3.8	3.7
Economy	5.4	5.2	4.8	4.6

The motivation section consisted of a single question, where research and academic staff were asked to state what they regard as meaningful work at university. Based on their answers, the most respondents have agreed that what they find highly satisfying and motivating is the opportunity to educate the next generation of students in their chosen discipline as well as in their attitudes to life, society, and environment, and their subsequent entry in the job market; also motivating is the opportunity to pursue selected research topics and bring new impulses for further development of their disciplines.

Most of the respondents also highly value the opportunity to creative work and the freedom of decision-making. What is regarded positively is also the possibility of a gradual building of a work team, who is subsequently able to efficiently solve practical problems and transform the acquired skills into the educational process. Most respondents have also mentioned that they feel obliged to the society and that they feel the need to give back to the society in another form what has been invested from public funds into their research disciplines. The respondents are also highly appreciative of the opportunity to work with the latest state-of-the-art technologies in the market.

Respondents actively involved in the area of industrial property rights all agreed on the importance of cooperation with companies on research and development, which is needed, applicable in practice, and fairly fast to implement, owing to the collaboration with the company.

## 4 Conclusion

The conducted qualitative survey among academic staff shows that when it comes to industrial property rights, cooperation with companies is of the utmost importance. As to monetary remuneration, the most satisfied are employees in the disciplines of physics and chemistry, followed by fisheries, health and social sciences, and theology. At the same time, employees in these disciplines are satisfied with clearly stated requirements on them and with the transparency of these requirements. The least satisfied academic staff are in the disciplines of computer sciences and construction engineering, where the results indicate average satisfaction.

As to internal motivation, the most satisfied are respondents from the areas of health and social sciences, closely followed by physics, chemistry, and theology. When comparing the nine disciplines under examination, the least satisfied respondents were in the disciplines of construction engineering and law.

Overall, it is apparent that the respondents are stable employees who can mostly imagine working at their current positions until the end of their careers.

Our research has showed that monetary remuneration is not the key element of motivation. It is equally important for the employees to be clear about the goals and rules of the organisation, along with solid administrative background and appropriate working conditions.

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## The Place of the Polish Food Industry in the European Union

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**Abstract.** The Polish food industry holds an important place in the EU food industry. In 2016, Poland was the 6<sup>th</sup> largest producer of food in the EU-28, with the share of 8.6% in the European output of the food industry. In the years 2004-2016, the output value of the Polish food sector expressed in comparable prices (adjusted by the purchasing power index in EUR) increased by nearly 60% to EUR 95.4 billion, whereby the EU-15 countries recorded an increase by just 25% to EUR 91.4 billion and the EU-13 countries an increase by 33% to EUR 192.5 billion. Over 80% of the food produced in the EU comes from EU-15 countries, and its main producers are: Germany (16.3% of the share of the EU food industry production), France (14.0%), Italy (12.2%), Spain (10.7%) and the United Kingdom (9.8%). That implies that the development pace of the Polish food sector during the analysed period was among the fastest across the EU, which reduced the distance between Polish food industry and the most developed EU countries, and Poland strengthened its position on the EU market. That contributed to enhancing labour productivity and increasing the turnover generated by enterprises in the food industry in Poland.

**Keywords:** Food Industry, Output Value of the Food Industry, Food Producers, Poland, EU.

### 1 Introduction

The objective of the study is to present the place of the Polish food industry in the years 2004-2016 against selected Member States of the EU-28, in particular those being major food producers in the European Union, i.e. Germany, France, Italy, Spain and Great Britain. The comparison covered, inter alia: the value of marketed production, employment, labour productivity and turnover values of enterprises.

The years 2004-2016 were marked by a very fast development of the Polish food industry. The output value of this sector in current prices increased by nearly 84%, while the EU-15 countries recorded an increase by just 24% and the EU-12/13 countries an increase by 65%. During the analysed period, the greatest increase in the output value of this industry was recorded, apart from Poland, by Bulgaria and Lithuania – with the value having nearly doubled. On the other hand, the largest food producers in the EU recorded different growth rates: Germany (+18%), France (+23%), Italy (+24%), Spain (+34%), Great Britain (+14%). However, considering the purchasing

power index in EUR for individual countries and using it to adjust the output value of the food industry in current prices, the increase in the turnover of the food industry becomes slightly different. In the years 2004-2016, Poland recorded an increase in the

**Table 1.** The Polish food industry against other Member States of the EU-28 in 2016 [1].

EU countries	Output value of the food industry (billion EUR) in		Change in the value of food industry production* 2016/2004 (in %)	Output of the food industry* per 1 resident in thousand EUR	Ratio of the output value of the food industry* to GDP (in %)
	current prices	comparable prices*			
EU-28	1075.9	1106.5	26.7	2.17	7.4
EU-15	964.5	914.0	25.5	2.25	7.1
EU-13	111.4	192.5	33.0	1.84	9.3
Belgium	45.2	41.5	47.7	3.67	10.7
Bulgaria	5.7	12.0	50.6	1.67	11.9
Czech Rep.	11.7	17.8	-7.4	1.69	6.6
Denmark	22.7	16.9	9.5	2.96	8.2
Germany	191.1	179.9	18.2	2.19	6.0
Estonia	1.6	2.2	35.8	1.69	7.4
Ireland	25.7	23.2	29.7	4.94	9.4
Greece	13.1	15.9	31.7	1.48	7.4
Spain	107.2	118.8	33.9	2.56	9.6
France	169.6	154.4	25.7	2.31	7.6
Croatia	4.5	7.1	-19.2	1.69	9.7
Italy	132.6	135.0	33.4	2.22	7.8
Cyprus	1.3	1.5	21.5	1.88	7.2
Latvia	1.6	2.4	-5.4	1.20	6.5
Lithuania	3.8	6.2	52.2	2.14	9.8
Luxemburg	0.9	0.7	4.1	1.17	1.6
Hungary	11.0	18.7	16.1	1.91	9.7
Malta	0.1	0.1	3.4	0.20	0.8
Netherlands	67.9	61.0	33.3	3.59	9.6
Austria	21.3	19.5	69.6	2.24	6.0
<b>Poland</b>	<b>53.8</b>	<b>95.4</b>	<b>59.6</b>	<b>2.51</b>	<b>12.5</b>
Portugal	14.5	18.3	39.4	1.78	7.8
Romania	10.9	21.6	31.5	1.09	6.4
Slovenia	1.9	2.3	0.8	1.10	4.6
Slovakia	3.5	5.2	11.1	0.96	4.3
Finland	10.2	8.3	16.5	1.51	4.7
Sweden	16.3	12.4	5.3	1.25	3.5
G. Britain	126.2	108.2	8.3	1.65	5.2

\* in comparable prices, i.e. in current prices adjusted by PPP

respective output of the food industry by nearly 60%. Higher growth was only in Austria (+70%). To compare, the value of marketed production increased by 26% in the EU-15 countries, and by 42% in the EU-12/13 countries (Tab. 1).

The integration with the EU had a favourable impact on the development of the Polish food industry [4]. It forced Polish enterprises in the food sector to restructure their processing plants to adjust them to the European requirements and standards [5]. Therefore, Polish enterprises in the food sector are currently deemed one of the most modern across the European Union, while the Polish food industry has become a major food producer in the EU [9]. In 2016, Poland was the 6<sup>th</sup> largest food producer in the EU, with the share of 8.6% in the European output of the food industry.

## 2 Materials and Methods

The development of the Polish food industry against selected Member States of the EU in the years 2004-2016 was assessed based on Eurostat data. The variability of marketed production of the food industry was calculated by means of the average annual growth rate, the trend function linear regression analysis (in absolute terms) and the compound interest formula [7] (in relative terms).

$$Kn = Ko \times (1 + r/100)^{n-1} \quad (1)$$

$$r = (\sqrt[n-1]{Kn/Ko} - 1) \times 100 \quad (2)$$

where:

Ko – value of the variable in the starting period,

Kn – value of the variable in the final period,

r – growth rate, average annual growth pace.

The comparability of the output value of the food industry in the Member States of the EU was ensured by adjusting the output value in current prices into comparable prices, by means of the purchasing power (parities) index in EUR for individual Member States of the EU. Purchasing power parity (PPP) – the exchange rate calculated based on the comparison of prices of goods and services in a fixed basket in different countries during the same period, expressed in local currencies. The aim of the study is to present the place of the Polish food industry in the years 2004-2016 against selected Member States of the EU-28. The aim of the study is to show the position of the Polish food industry against the background of EU countries in the period of integration with the EU (2004-2016).



### **3 Results and Discussion**

#### **3.1 Comparative Assessment of the Development of the Polish Food Industry against the EU in the Years 2004-2016**

The European Union has been a major food producer in the world for years now. The EU-15 countries produce over 80% of the output, with the main producers being: Germany with the share of 16.3% in the output value of the European food industry, France (13.9%), Italy (12.2%), Spain (10.7%) and Great Britain (9.8%). Poland is the 6<sup>th</sup> largest food producer in the EU, with the share of 8.6% in the output value of the EU food industry. The output of the Polish food industry (in comparable prices), amounted to EUR 95.4 billion in 2016, mostly in the group of the EU-13 countries. However, this value is nearly two times lower than in Germany (EUR 179.9 billion), but higher than in Holland (61.4) or Belgium (41.5) (Tab. 1).

The food industry is more important for the Polish economy than for the Member States of the EU [8]. In 2016, the turnover of this sector accounted for 12.5% of Polish GDP and was the highest in the EU-28. To compare, this ratio amounted to 7.1% for the EU-15 countries, and 9.3% for the EU-13 countries. In the EU-15, the highest ratio of the output value of the food industry to GDP in 2016 was achieved by: Belgium (10.7%), Spain and Holland (9.6%), but it amounted to as little as 6.0% in Germany and 5.2% in Great Britain. In the EU-13, the highest ratio was recorded by Bulgaria (11.9%), and the lowest one by Slovakia (4.3%) and Malta (0.8%). In the majority of the Member States of the EU, the ratio declined in the years 2004-2016, in particular in the EU-13 countries (nearly by 40% on average). The greatest decrease was experienced by Slovakia (by 37%) and Romania (by 35%). On the other hand, Poland witnessed an increase by 10%. During the analysed period, the ratio improved only in a few countries of the EU, above all in Greece – by 44%, Austria – by 22%, and in Italy – by 11% (Tab. 1).

In 2016, the Polish food industry had a value of EUR 2.5 thousand, expressed in the value of marketed production per capita, and was similar to the largest food producers in the EU, i.e. Spain (EUR 2.5 thousand), France (EUR 2.3 thousand), and Italy and Germany (EUR 2.2 thousand each). On the other hand, the lowest value was characteristic for Ireland (EUR 4.9 thousand), Belgium (EUR 3.7 thousand), Holland (EUR 3.6 thousand) and Denmark (EUR 3.0 thousand) (Tab. 1).

In the years 2004-2016, the output value of the food industry in the EU-28 increased at an average pace of 2% a year, whereby the growth rate was equal to 4.0% in Poland, if compared with France (1.9%), Germany (1.4%) and Great Britain (0.7%) (Table 2). However, considering its fluctuations in selected periods during the years 2004-2016, the years directly after the accession to the EU 2004-2007 were the best for Poland [11]. At that time, the output value of the food industry increased at an annual pace of 7.6%, three times faster than in Germany and in the EU-15. On the other hand, the years 2013-2016 brought a lower growth rate of the output value in the majority of the Member States of the EU, excluding Spain (+3.6%) and Italy (+3.1%) (Tab. 2).

**Table 2.** The growth rate of the output value of the food industry in selected countries of the EU-28 (in %, on an annual basis), in comparable prices [1].

EU countries	2004-2016	2004-2007	2008-2012	2013-2016
EU-28	2.0	2.6	1.8	1.4
EU-15	1.9	2.3	1.5	1.5
EU-13	2.4	4.1	3.0	0.9
Austria	4.5	3.0	3.4	2.2
Belgium	3.3	5.5	3.7	1.3
Germany	1.4	2.8	1.0	-0.1
Spain	2.5	4.5	0.8	3.6
France	1.9	3.7	1.0	1.6
Ireland	2.2	0.4	7.7	2.1
Italy	2.4	2.3	1.7	3.1
Netherlands	2.4	4.6	2.1	0.9
G. Britain	0.7	-4.9	1.6	0.9
<b>Poland</b>	4.0	7.6	5.6	1.6
Czech Rep.	-0.6	-0.6	-1.1	-0.5
Hungary	1.3	-1.6	3.6	0.3
Lithuania	3.6	8.5	3.8	-1.3
Romania	2.3	4.1	1.8	0.4
Bulgaria	3.5	6.8	-0.1	2.2

### 3.2. Employment and Labour Productivity in the Food Industry in the EU

There are approx. 411 thousand workers in the Polish food industry, which accounts for approx. 9% of the total number of workers in the food industry in the European Union. Poland takes the forth position among the EU-28 countries. A higher volume of employment (in thousand workers) is created only by: Germany (874), France (604) and Great Britain (441), and a slightly lower volume by: Spain and Italy (approx. 360 each). The years 2004-2016 witnessed a decrease in employment in the food industry in the EU-28 by 2.2%, whereby by 11.3% in the EU-13, compensated by an increase by 1.2% in the EU-15. During that period, the volume of employment shrank by 3% in Poland (Tab. 3).

In 2016, the value of marketed production per one worker in the Polish food industry amounted to EUR 232 thousand, slightly below the EU-15 average (EUR 272 thousand). The highest labour productivity in the food sector was achieved by Holland (EUR 481 thousand) and Belgium (EUR 459 thousand) (Table 3). The Polish food industry had the highest labour productivity in the EU-13, higher by 33% than their EU-13 average (EUR 175 thousand). In the years 2004-2016, labour productivity in the Polish industry improved by 65%, by 24% in the EU-15 and by 50% in the EU-13. Branches of the food industry with a very high and high degree of globalization reported high level of labour productivity [2]. Its improvement was mainly driven by the increased expenditures for technical equipment. That resulted from a significant

investment boom, in particular following Poland's accession to the EU, and the decreased volume of employment [10]. The improved labour productivity in the food industry was a common phenomenon experienced by all the EU Member States.

**Table 3.** Employment and labour productivity in the food industry in selected Member States of the EU-28 [1].

EU countries	Employment (in thousand)		Labour productivity* (in thousand EUR per worker)		Growth rate of labour productivity 2016/2004	Average growth rate of labour productivity in the years 2004-2016 (in %, on an annual basis)
	2004	2016	2004	2016		
UE-28	4561.5	4462.4	191.4	248.0	29.6	2.2
UE-15	3319.0	3359.9	219.5	272.0	24.0	1.8
UE-13	1242.5	1102.4	116.5	174.6	50.0	3.4
Austria	74.6	81.2	154.2	240.0	55.7	3.8
Belgium	91.6	90.4	306.8	459.0	49.6	3.4
Germany	824.4	873.6	184.6	205.9	11.5	0.9
Spain	363.5	373.2	244.0	318.4	30.5	2.2
France	616.6	603.6	199.2	255.8	28.4	2.1
Ireland	47.5	50.8	376.8	457.0	21.3	1.6
Italy	347.5	361.2	291.2	373.7	28.3	2.1
Netherlands	127.2	126.8	360.1	481.4	33.7	2.5
G. Britain	470.9	440.7	212.1	245.4	15.7	1.2
<b>Poland</b>	<b>423.5</b>	<b>411.0</b>	<b>141.2</b>	<b>232.2</b>	<b>64.5</b>	<b>4.2</b>
Czech Rep.	123.9	104.0	144.5	171.0	18.3	1.4
Hungary	128.3	103.0	125.5	181.5	44.6	3.1
Lithuania	53.3	42.3	76.9	147.7	92.0	5.6
Romania	203.6	181.6	80.6	118.7	47.4	3.3
Bulgaria	105.6	93.0	75.8	129.6	71.0	4.6

\*in comparable prices

In the years 2004-2016, labour productivity in the Polish food industry increased at an average pace of 4.2% a year, if compared with the annual rate of 1.8% in the EU-15 and the annual rate of 3.4% in the EU-13. The greatest growth rate of labour productivity during the analysed period was recorded by Lithuania (5.6% on an annual basis) and Bulgaria (4.6%) (Tab. 3).

### 3.3 Concentration of Production in the Food Industry in the EU

In 2016, the Polish food industry counted approx. 14.4 thousand enterprises. That was equal to nearly 5% of the European food enterprises and placed Poland on the 6<sup>th</sup>

position in the EU-28. In the years 2004-2016, the number fell by 21.4% in Poland, and by 8.3% in the EU-15 and by 11% in the EU-13. The turnover generated by an average enterprise indicates an increase in the economic strength and competitiveness of Polish food enterprises on the European market [6]. In 2016, the turnover of the food processing enterprise amounted to EUR 6.64 million in Poland and was twice as high as in 2004. In the same year, the average turnover of the food enterprise was equal to EUR 3.88 million in the EU-15, and EUR 3.20 million in the EU-13. If compared with the EU, Polish food enterprises have quite a good position. The average turnover generated by these enterprises are comparable with the German ones (EUR 6.76 million) and much higher than in: Spain, France and Italy. However, they are much below the level characteristic for: Ireland (EUR 12.54 million), Great Britain (EUR 11.03 million) and Holland (EUR 9.58 million).

**Table 4.** The average turnover of enterprises\* in the food industry of the selected Member States of the EU-28 measured by the output value of 1 food enterprise, in million EUR [1].

EU countries	Number of enterprises (in thousand)		Average turnover value* (in million EUR)		Turnover growth 2016/2004	Average turnover growth rate in the years 2004-2016 (in %, on an annual basis)
	2004	2016	2004	2016		
UE-28	311.1	295.6	2.81	3.74	33.1	2.4
UE-15	256.9	235.5	2.84	3.88	36.6	2.7
UE-13	54.2	60.2	2.67	3.20	19.9	1.5
Austria	4.3	3.9	2.66	5.00	88.0	5.4
Belgium	8.2	6.9	3.42	5.98	74.9	4.8
Germany	32.6	26.6	4.67	6.76	44.8	3.1
Spain	29.9	27.5	2.97	4.32	45.5	3.2
France	68.2	59.8	1.80	2.58	43.3	3.0
Ireland	0.6	1.9	29.83	12.55	-57.9	-7.0
Italy	70.1	56.8	1.44	2.38	65.3	4.2
Netherlands	4.6	6.4	10.04	9.59	-4.5	-0.4
G. Britain	7.1	9.8	14.13	11.03	-21.9	-2.0
<b>Poland</b>	<b>18.3</b>	<b>14.4</b>	<b>3.27</b>	<b>6.64</b>	<b>103.1</b>	<b>6.1</b>
Czech Rep.	6.1	9.8	3.15	1.81	-42.5	-4.5
Hungary	7.0	6.8	2.31	2.73	18.2	1.4
Lithuania	1.2	1.7	3.33	3.58	7.5	0.6
Romania	10.9	8.8	1.50	2.46	64.0	4.2
Bulgaria	6.4	6.3	1.26	1.91	51.6	3.6

\* in comparable prices

The concentration and consolidation of the food sector are progressing across the European Union. In Poland, the process is much faster than in the majority of the

remaining Member States of the EU [3]. The gap between Poland and the EU Member States with a high production concentration in this sector is shrinking.

## 4 Conclusions

In the years 2004-2016, Poland strengthened its place on the European market as one of the largest food producers in the EU. The share of the Polish food industry increased to 8.6% of the value of marketed production of the food industry in the EU-28 (in comparable prices), which implies an increase by 1.7 pp in comparison with 2004. Poland is the 6<sup>th</sup> largest food producer in the EU, following: Germany, France, Italy, Spain and Great Britain.

In the years 2004-2016, the growth pace of the Polish food industry measured by the increase in the value of marketed production amounted to 4.0% on an annual basis and was double the average pace in the EU-28 and even faster than the one experienced by the largest food producers in the European Union, i.e. Germany (1.4%), France (1.9%), Italy (2.4%), Spain (2.5%) and Great Britain (0.7%).

The labour productivity of the Polish food industry measured by the value of marketed production per one worker (in comparable prices) increased by 64.5% in the years 2004-2016 (i.e. at the annual pace of approx. 4.2%). In 2016, the labour productivity of the Polish food industry corresponded to 85% of the average labour productivity in the EU-15 countries, which means that the gap between the Polish food industry and the EU-15 countries shrank by 21 pp during the analysed period.

In 2016, the turnover generated by enterprises in the Polish food processing industry amounted to EUR 6.6 million per enterprise (in comparable prices) and was over two times higher than in 2004 and exceeded the average turnover of food enterprises in the EU-15 by 70%.

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## Eco-innovation as an Element of Business Value and Performance Management

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**Abstract.** The intangible assets create the value of the enterprise and affect its performance and business model. The basis for creating these values is the exchange of information (communication) and proper management of them. There is a dichotomy between assessing the value of a company and its effectiveness through the prism of exclusively material aspects, but efficiency can be understood in various and multi-aspect terms. One of them is green economy perspective, which is answer to financial perspective of value and effectiveness assessment. Moreover, the green economy is focused on realisation of sustainable development principles and values. To address to environmental and socio-economic problems a transformation of business model is needed, to spread the green values used by green sectors. Then implementation of eco-innovation and green management helps to create green jobs, especially by participation in the transformation of agriculture. The agriculture sector is still important part of each country's economy, which also cause majority of damages to the natural environment. In this article chosen statistical data analysis and descriptive method were implemented to prove mentioned above induction and deduction processes.

**Keywords:** Business Value, Effectiveness Management, Resources Balance.

### 1 Introduction

Modern enterprises need to change to survive in vivid business environment and to possess a competitive advantage. They have to also, observe the market in real time, participate in mechanisms, impulses and react to them, and finally anticipate and overtake to have certain degree of control [1, 8]. This is a mechanism of the market orientation understood as the ability to systematically generate relevant information [6, 14] about current and latent customer needs, spread this information across all company departments and use this information in decision making and subsequent behaviour [1, 7]. To obtain conscious and full reception of reality, "where there are masks, artificialities and fragments of the image" [12], is in our opinion possible only if not only the management of the company will listen to it and make final decisions, but also if other employees will be involved in these processes [14]. Therefore, the

communication is the most important to set a proper strategy or formulate a business model [13, 15]. Although the eco-innovations are considered both as an effect of new values approach and engine of future development [9, 16, 20]. On the one hand, this postulate will cause that the value of the enterprise will not be limited to the material factors determining the enterprise, and the intangible factors will have an advantage, which have much greater potential and possibilities [6]. On the other hand, the efficiency of the enterprise will definitely increase in the longer time period [5, 8]. The aim of the article is to verify the above presented thesis based on analysis of secondary statistical data related to the economy transformation towards the green economy. Therefore, an agriculture sector secondary data research and its results were described in this paper.

## **2 Research Problem**

Balancing the material and intangible factors that determine the market value of the organization is a phenomenon that we observe in many enterprises recording the growth of their profits [13]. The modern enterprise is the sum of both the values related to the equipment as well as human capital or intellectual value in the form of, inter alia, inventions created. It can be assumed that the company value is the sum of the net value of its assets and the value of non-proprietary components [6, 8, 15]. The company's value is the sum of all special benefits that cannot be identified in any way relating to an existing enterprise: good name, capable management and staff, good credit terms, product or service reputation and location benefits [8, 17]. The value of the company is the sum of all the opportunities effectively used by the company [11]. Many authors question the determination of the company's value by investors on the stock exchange [3, 5, 9, 15]. Therefore, it is difficult to disagree, that the adoption of the maximum value as the primary requires action in the environment of a well-developed capital market enterprise, which will allow the most objective valuation of the benefit [3, 9, 17].

The second basic concept in the article - the effectiveness of enterprises, has many definitions and interpretations. The perception of effectiveness is important not only from the economic perspective but also in the area of efficiency and effectiveness of the operation. In this context, "Effective organization is characterized by productivity, the ability to adapt to changes, loyalty, satisfaction of people with work and creativity" [12]. When considering the effectiveness in terms of the enterprise, it should be remembered that it has many levels which should be analysed as well [11]. These layers are: organizational efficiency, financial efficiency, market efficiency. In general, the following efficiencies can be distinguished as:

- economic efficiency - it forms the basis of the company assessment system; it results, among others, from the comparison of the results of operations with the expenditures incurred on it,
- social efficiency - it is an assessment of comparison of the supply of business results with demand and social needs,



- technical efficiency - is an assessment resulting from a comparison of the obtained material result of a given activity with a technical model of the product produced by the enterprise,
- ecological efficiency - this is an assessment resulting from a comparison of the state of the environment before and after a certain phase of the company's operation.

Economic efficiency is considered from the perspective of two main shots [9, 13]. These are: production, in order to be effective, which must be carried out in such a way that the resources possessed by the enterprise are used to increase the level of production of a given good, while not lowering this level for another commodity [8, 14]. The second is an exchange, and to be effective is possible only if, after introducing changes to the distribution of goods, this treatment will bring benefits to some without causing losses to others [3, 6].

There is a level of efficiency between the exchange and production [11, 13]. It occurs when consumers are able to replace one good with another, with the simultaneous possibility of converting the production of one good to the good that suits it. Therefore, the scope of the term efficiency covers:

- efficiency (in terms of technical-economic management school),
- competence (in terms of organizational and bureaucratic Weber),
- efficiency (in terms of praxeology of Kotarbiński),
- functionality (in the humanistic aspect of Beckhard),
- communication skills (in Lawless's personality approach),
- morality (in the behavioural perspective of Obuchowski and Scalan).

Efficiency is also considered as an effect of the innovation implemented into organisation. There is a special kind of innovation which is related to the values related to the environment protection and sustainable development. It, due to the greater complexity and different hierarchy of objectives, is very different from innovation in general. The aim of the eco-innovation is to eliminate or at least reduce the negative impact of business on the environment [14, 16 19].

It is understood that the concept of "eco-innovation" is new. The prefix "eco-" comes from the word ecology, while by "innovation" we mean in everything is new. It is generally recognized that eco-innovations generate new products and processes that provide value for the consumer and business, but also reduce the impact on the environment. Already in the 1990s, research on eco-innovation began. Their development was influenced, among others, by increased awareness of environmental threats, as well as the search for a more balanced model of economic development [3, 16, 18].

Eco-innovation (according to classical definition) is a new product that provides value for the customer and for business, while significantly reducing the negative impact on the environment [4]. Schumpeter worked very intensively with the concept of innovation, meaning the introduction of something new into the economic system [15]. The first case of innovation, as Schumpeter defined it, is the production of a new

good that consumers do not yet know, or the productions of goods of a new quality. The second is the introduction of new methods of production which are virtually unknown to the industry. Schumpeter saw the main role of the entrepreneur as that of an innovator entering a functioning market while also becoming the main driver of the economic process [15]

The European Commission, on the other hand, defines eco-innovation as "a form of innovation that aims to make significant and provable progress towards the goals of sustainable development by reducing environmental impact or achieving more effective and responsible use of natural resources including energy" [2].

The eco-innovation influenced also Chinese companies. In 2014, the energy consumption of manufacturing industry accounted for 57.55% of the total energy consumption of China, of which the consumption of coal in manufacturing occupied 42.75%. Therefore, China want to achieve the dual goals carbon emission reduction and manufacturing power in 2025 [9].

Eco-innovations lead to integrated solutions aimed at reducing the resources and energy inputs, while at the same time improving the quality of the product and service. Therefore, their impact on agriculture is visible among other sectors of economy under transformation [2]. The aim of eco-innovations is to develop new products and processes that significantly reduce their negative impact on the environment [13, 15]. One of such innovations is the creation of green jobs, the aim of which is to reduce the pressure on the natural environment on the part of the economy and consumption

### **3 Methodology and Goal**

The main goal of the article is to prove the thesis that eco-innovation and intangible values combined together allow companies to increase their performance in the longer time period. To verify so declared thesis, a research question was formulated as follow: do companies with more share of green jobs have higher performance? The performance measurement was based on secondary data analysis obtained from Main Statistical Office. These basic indicators and trends describing Polish Economy were applied. The analysis in based on comparative research and simple statistical methods and Florence's indicator were incorporated. In the further part of article main sectors were indicated with the highest share (%) and number of employed in green jobs. Therefore, the research question was addressed describing the economy transformation towards the green economy.

### **4 Business Models and its Effectiveness in Aspect of Value Creation**

Contemporary concepts of the business model vary in a way of emphasis on the sources of value creation, by:

- articulation of the value proposal, i.e. the value created for recipients through a specific product/ service offer);

- definition of the target market segment and how is specified the generation mechanism revenue (i.e. it defines the recipients of the offer and the reason for which they will be interested offer);
- definition of the structure of the value chain required for creation and distribution offers and complementary resources necessary to support the position in the value network;
- detail the mechanisms by which the company will receive payment for delivered offer and thus earn revenue;
- determination of the cost of the offer and profit level possible to be obtained;
- determination of the company's position in the value network;
- formulation of the assumptions of a competitive strategy that allows obtaining and maintaining competitive advantage over rivals.

There is also the resource approach in the enterprise business model, where models are formed of three elements:

- resources and competences;
- organizational structure;
- value proposition offered to customers in the form of products and or services.

Another concept is green jobs. This is any type of professional activity that helps protect the environment and fight climate change by saving energy and resources, promoting renewable energy, reducing waste and pollution, and protecting biodiversity and ecosystems.

According to the definition of green jobs, the most important for the authorities' government and local government have indicators regarding the social sphere to which include categories: work practices, human rights, society (building community) as well as product liability. Importantly, an important group of factors there are social factors, especially indicators of direct energy consumption from primary sources and creating new jobs.

It is also important for the development of agriculture that people trained by sharing with their ecological skills with colleagues and neighbours, they become "ambassadors of ecology" in their neighbourhood and workplace, which is a factor conducive to change. In addition, an important element of green jobs there is an increase in entrepreneurship and competitiveness in their area and an increase in the number new jobs surrounded by agriculture. Creating green jobs is a new proposal to combat unemployment and social exclusion.

## 5 Statistical Data Analysis

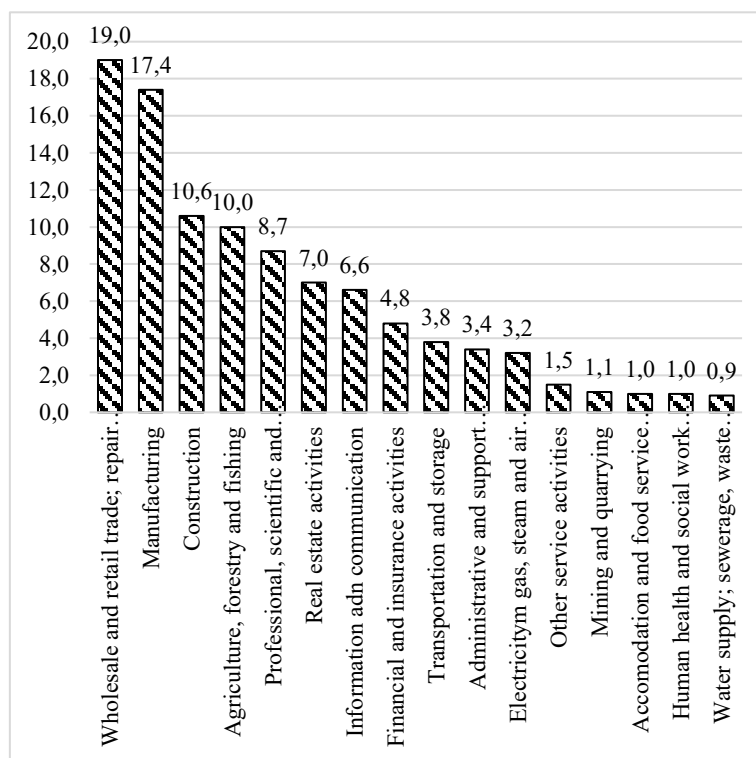
The adopted method in this paper was secondary statistical data research conducted among the 17,062 organisations (business entities) which basic data is presented in Table 1. The research was conducted by the Main Statistical Office in Poland (GUS) in

2017 among Polish economic entities [10]. The aim of the original research were financial results of business entities in first half of the year 2017.

**Table 1.** Economic entities with 10 and more persons employed in months I-VI in 2013-2017. [10]

Years	2013	2014	2015	2016	2017
Total number of employed	46.890	46.912	47.127	47.547	47.181
Number of persons employed (10-49)	29.936	30.198	30.265	30.426	29.729
Number of persons employed (50-249)	13.880	13.610	13.636	13.801	13.984
No. of persons employed 250 and more	3.074	3.104	3.226	3.320	3.468

The object of the original research was to measure the effectiveness, including not only an economic but also a social one. A comprehensive view of the indicators focused on the value of the enterprise with its potential, opportunities and threats, as well as the challenges of the global economy. The subject of research was micro, small, medium-sized enterprises in Poland (as presented in Table 1).



**Fig. 1.** Structure [%] of the economic entities groups according to the NACE in the research [10].

Pursuant to the Statistical classification of economic activities in the European Community, abbreviated as NACE Rev. 2 (French: Nomenclature statistique des activités économiques dans la Communauté européenne), the Companies which took part in the research were classified in many different fields of activity (Fig.1).

Presented data can be compared among first four groups of economic entities (formulated by the PKD classification) which share in the research group was over 10%. On this background the number of the green jobs in each group was estimated [20].

**Table 2.** Number of employed and green jobs in chosen groups of NACE in 2016 (I-VI) [10].

group	% of employed	% of green jobs
Wholesale and retail trade	24	2
Manufacturing	13.2	6.2
Construction	12.7	1.3
Agriculture, forestry and fishing	11.4	9.1

Although in this research the greatest number of people were employed in wholesale and retail trade (24%) among these jobs only 2% were green in 2016. On the other hand, green jobs were majority among jobs offered in agriculture, forestry and fishing group of entities which participated in the research conducted by Main Statistical Office in Poland. However, the number of green jobs was estimated based on the research with method and definition described by the green sectors of PKD [4, 20].

## 6 Conclusion

Based on the above the issue of creating new jobs in agriculture it should be emphasized that the aim of these activities is to reduce the pressure on natural environment on the part of economy and consumption, and consequently – investing in sectors that at the same time serve the environment and bring economic returns and social, for example manufacturing and whole sale and retail trade. It should also be noted that promotion ecological transformation of the local economy, creating stable, local jobs and maintaining the long-term profitability of business operations in the agricultural sector is important from the point of view of economic development. New green jobs are related both to the implementation of sustainable policies development, with socio-economic changes as well as green development technology.

The largest number of green jobs is created in the agriculture sector, which become more ecological and greener over recent years. However, the largest number of employed is in the wholesale and retail trade, which is not considered as a green sector of the economy. Companies from this sector are characterised by the better performance than agricultural economic entities.

The aim of the further research should be to construct specific performance indicator supported by the theoretical model, which can expand described in this paper economic phenomena.

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# Employees' Commitment Influence on Quality of Management Methods – Empirical Research Based on Different Business Contexts

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**Abstract.** The paper concerns the role of employees' commitment in increasing the quality of management methods used in organizations. The first part of the paper concerns the theoretical background for formulation of research hypotheses concerning this relation occurrence in different business contexts (developing and developed economy). The second part of the paper presents the results of empirical research conducted among more than 1000 organizations from Poland (as an example of developing economy) and Switzerland (as the example of developed economy). The obtained results confirm the existence of assumed relations.

**Keywords:** Management, Employees' Commitment, Management Methods Quality, Empirical Research.

## 1 Introduction

Employees' commitment is a subject that appeared in the literature in the 1990s under the terms "high commitment", "high involvement", "high performance" [20] and after a while it even evolved into the method of employees' commitment management. It is understood as "employees' faithfulness to the organization, the willingness to exert effort on behalf of the organization, the degree of goal and value between the employee and the organization, and the employee's desire to remain hired by the organization" [15]. In recent years, the literature indicates the growing importance of employees' commitment in the organization as a factor affecting the organization's ability to build competitive advantage and increase organizational performance [6]. However, it seems that above all else, employees' commitment has the capacity to influence the management methods quality, which is considered as one of drivers of performance in contemporary organizations [3, 10]. Moreover, as the management methods use and quality is significantly differing depending on business context and they are considered to be an important factor supporting the improvement of organizations operating in developing economies during their transition to developed economies (even though their availability and skills needed for proper use are weaker), it seems that the business context might be an important moderator of this



relation. The literature coverage of the role of employees in fostering and sustaining management methods quality is very weak and conclusions concerning this relation are non-existent. Therefore, the main aim of the article is to analyze and verify the potential influence of employees' commitment on quality of management methods implemented in organization with regard to different business contexts.

## 2 Management Methods in Organization

The management of organization is connected to five basic notions (defined by [10, 17]): concept, methodology, methods, techniques and management solutions. Concept are considered to be a comprehensive, developed and defined basis for consideration of any idea. Methodology is understood as the entity or closely related collection of methods, rules and disciplinary postulates. **Methods** are defined as goal- and problem- ordered types of procedures, which are especially regular and systemic ways of setting and realizing the given goal. Techniques are the manner in which technical details are treated. Corresponding management solutions are understood as the way for realization of management ideas.

Management methods quality is a notion not very well analyzed in the literature [3, 12]. The notion of quality is defined by ISO 9000 as the “degree to which a set of inherent characteristics fulfils requirement”. Therefore, the quality is the degree to which set of features or characteristics of a product or service influences its ability to satisfy stated or implied needs. It may be then assumed that a product or a service has good quality when it complies with the requirements, which are specified by different stakeholders. Based on that, **management method quality** can be defined as a degree to which management methods fulfill the requirements specified by the organization, i.e. its implementation and use are allowing organization to obtain a desired level of results [17].

## 3 Employees' Commitment Role in Improving Management Methods Quality

The relation between management methods quality and employees' commitment is highly dependent on the type of management method. It is especially true for the Human Resources Management (HRM) methods, which directly refer to a strategy designed to acquire, develop, manage, motivate, and gain the commitment of employees as key resources to the organization [2], will be much more closely related to employees' commitment than other management methods. However, what is true for all management methods, employees' commitment ensures that all practices, including management methods implemented in organization, conform to quality requirements and moreover, are followed by all employees from the organization [7, 14]. Therefore, it seems that there is a potential for the relation between employees' commitment and management methods quality [17]. The interest in examining these relations began at the turn of the century, after the industrial revolution caused

managers from all types of industries to look for a new definition of work, role of employee and different ways to increase organizational performance [1, 5]. Van der Wiele et al. [19] analyzed acceptance of philosophy of TQM and stated that it has significant human resources implications and employees' commitment is one of the affected aspects. The majority of authors suggest that employees' commitment is sort of prerequisite for enhancing quality of management methods in organization. First of all, because of the fact that according to studies closely related to employees' commitment [1], connected with OCB [11], motivation [8, 18], and social exchange [9] – the higher is their commitment, the better is the quality of solutions, which are available for the employees, as they are able to see that they have all they need to perform their tasks efficiently and only their commitment and approach to their job may stop them from achieving goals, which fosters the increase of that commitment and influences quality of solutions, which is dependent on their proper (and committed) use. Management methods are one of the most important sources of solutions available for employees [4]. Second of all, and more importantly, the quality of management methods is highly dependent on their ability to fulfill the organizations' requirements [17]. Hence, the high level of employees' commitment is a prerequisite enabling employees to use available management methods to fulfill those needs. Without that, the simple fact of those methods' availability will not be able to generate any benefits for the organization. Hence, it can be assumed that there is a possibility that employees' commitment influences quality of management methods. Therefore, following hypotheses are formulated:

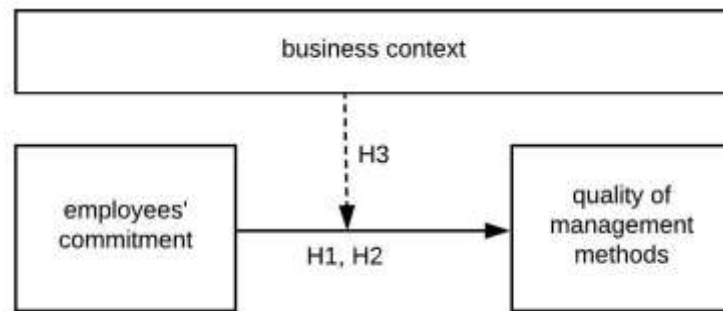
*H1: Both in organizations operating in Poland and Switzerland, there is a positive relation between management methods quality and employees' commitment.*

*H2: Employees' commitment influences the quality of management methods used in organization.*

Moreover, there is another factor which should be considered in case of this relation – business context. The business context significantly influences the organizations' access to business solutions, which differs in case of their complexity, maturity and availability. Management methods can be considered as one of those solutions. Therefore, it may be assumed that in more developed economy, where the availability of more mature and complex management methods is higher and they are used for a significantly longer period of time, the role of their determinants will be more significant. Moreover, management methods are considered to be an important factor, which supports the improvement of organizations operating in developing economies. They are prone to reduce the gap between developing and developed economies [10, 13, 16]. Therefore, it would be easier to achieve high management methods quality in more developed economies and averagely higher levels of employees' commitment will more significantly influence it. Therefore, the following hypothesis can be formulated:

*H3: In organizations operating in Switzerland, the influence of employees' commitment on quality of management methods implementation in organization is stronger than in organizations operating in Poland.*

An overview of the proposed hypotheses is presented in Figure 1.



**Fig. 1.** An overview of research hypotheses.

## 4 Empirical Research Overview

In order to verify the proposed hypotheses and identify the level of all variables needed to achieve this aim in two business contexts, the survey was conducted and it is presented in [17]. The main survey was preceded by the pilot one conducted at the beginning of 2018 among the group of 50 organizations. It identified the issues concerning ambiguity of several questions. The ambiguous questions were rewritten in order to obtain more informed response from the organizations participating in main survey and two questions were omitted because they generated unreliable responses. The main research was conducted as a part of a research project “The IT reliability influence on the quality of management methods and techniques”, no. 2017/01/X/HS4/01967 financed from the funds of the National Science Center in Poland. The main survey was conducted in March 2018, among organizations located in Poland and Switzerland, which was the only condition limiting the sample (organizations were surveyed regardless of size, industry or type of business etc.), using online survey service: SurveyMonkey. Respondents panels provided by the SurveyMonkey were used as the sampling technique. Only one survey was carried out anonymously in one organization, and it was completed by employees who have a broad view of the entire organization.

### 4.1 Research Sample Overview

The research sample contains the organizations, chosen randomly from a purchased respondent's panel, operating in Poland and Switzerland. 558 valid responses were collected from Poland and 564 valid responses were collected from Switzerland [17]. It is a very large sample for this kind of study and can be a basis for overall

conclusions concerning the given topic. Sample characteristics are presented in Table 1 and clearly show that the sample is covering organizations of all sizes and all types. The selection of organizations from two countries is intentional and is aimed at including into the sample organizations assessing their employees' commitment and management methods quality as low (below 3, what is true for sample from Poland) and as high (above 3, what is true for sample from Switzerland). Moreover, as one of the aims of the publication is the analysis of differences between developing and developed economy, the selection of research sample containing organization operating in both of them was crucial.

**Table 1.** Research sample characteristics from Poland.

<b>Organization size</b>	<b>Poland</b>	<b>Switzerland</b>
Micro (below 10 people)	107	114
Small (11-50 people)	140	134
Medium (51-250 people)	134	114
Large (above 250 people)	177	202
Total	558	564

#### 4.2 Variables Overview

Three variables were identified in order to verify the formulated hypothesis.

*Management methods quality* will be measured with results obtained due to implementation of all management methods implemented in organization. 18 results were identified and their change caused by implementation of each management method (and all management methods in organization) was measured on a Likert scale (from very positive influence to very negative influence with the middle point: no influence). Based on the assessment of every item (one item = one result), four key variables were defined [17]: *results related to efficiency*, *results related to employees*, *results related to product* and *results related to innovativeness*. An overview of the variables' development is presented in Table 2.

**Table 2.** Overview of variable: management methods quality.

<b>Group</b>	<b>Items</b>
<b>Results related to efficiency</b>	Adaptation of the organization to changes taking place in the environment
	Improvement of the organization's competitiveness
	Increase of the chances for the long-term existence of the organization
	Overall increase in the efficiency of the organization's management
	More effective achievement of the organization's goals

<b>Results related to employees</b>	Shortening of the decision-making time
	Better flow of information inside the organization
	Increase of satisfaction and increase of employee morale
	Increase in employee involvement in achieving results
	Improvement of the competence of employees
<b>Results related to product</b>	General improvement of the organization's financial results
	More effective and more rational management of the organization's resources
	Increase in the quality of products
	Improvement of the timeliness of production orders
<b>Results related to innovativeness</b>	Increase in the number of changes in products / services
	Increase in the number of changes in business processes
	Increase in the number of organizational changes
	Increase in the number of marketing changes

*Employees' commitment* will be measured based on eight commitment building elements, based on methodology developed by Mone and London (2009) and Mone et al. (2018) presented in Table 3. The items were phrased in form of statements to be evaluated on a Likert scale (from I strongly agree to I strongly disagree with a middle point: I do not have an opinion) [17]. One key variable was defined: *employees' commitment*.

**Table 3.** Table captions should be placed above the tables.

<b>Group</b>	<b>Items</b>
<b>Employees' commitment</b>	employees are motivated to improve their productivity and find better ways to do their job,
	communication on the part of the organization's management helps employees to understand the organization's strategies, missions and goals,
	employees feel that they have enough resources to do their job effectively,
	employees feel that the management of the organization thinks about their good,
	employees are satisfied with the possibilities of promotions and personal development,
	employees recognize that not only payment, but also additional benefits and work atmosphere are benefits from employment,
	employees have confidence in the management of the organization,
	employees believe that they receive enough feedback from their supervisors to improve their efficiency on this basis.

### 4.3 Research Results

In order to verify the proposed set of hypotheses, the U Mann – Whitney, correlation and regression analysis was performed. First, the differences between averages values of variables obtained from samples from Poland and Switzerland were verified and the results are presented in table 4.

**Table 4.** Results obtained due to implementation of management methods and employees' commitment in organizations from Poland and Switzerland.

	Poland (n=558)			Switzerland (n=564)			Test U Mann - Whitney	
	M	SD	MD	M	SD	MD	Z	p
Results related to efficiency	2.19	0.65	2.14	3.54	1.01	3.71	-18.556	<0.01
Results related to employees	2.15	0.75	2.00	3.58	1.10	4.00	-17.984	<0.01
Results related to product	2.17	0.72	2.25	3.52	1.05	3.50	-17.981	<0.01
Results related to innovativeness	2.27	0.72	2.25	3.56	1.05	3.50	-17.536	<0.01
Employees' commitment	2.66	0.91	2.50	3.52	1.11	3.50	-13.472	<0.01

The obtained results allowed to verify that Poland and Switzerland are indeed various business contexts and quality of management methods (in case of all groups of results) and employees commitment is evaluated positively in Switzerland ( $M > 3.0$ ) and negatively in Poland ( $M < 3.0$ ). Next, the correlation analysis was performed and the results are presented in table 5.

**Table 5.** Correlation analysis results

	Employees' commitment (Poland)	Employees' commitment (Switzerland)
Results related to efficiency	$r=0.177$ ; $p<0.01$	$r=0.632$ ; $p<0.01$
Results related to employees	$r=0.177$ ; $p<0.01$	$r=0.653$ ; $p<0.01$
Results related to product	$r=0.166$ ; $p<0.01$	$r=0.611$ ; $p<0.01$
Results related to innovativeness	$r=0.157$ ; $p<0.01$	$r=0.557$ ; $p<0.01$
Results (overall)	$r=0.173$ ; $p<0.01$	$r=0.599$ ; $p<0.01$

The obtained results confirm that indeed there is a statistically significant relation between management methods quality and employees' commitment, which allows for

acceptance of hypothesis H1. Moreover, the correlation is weak in case of sample from Poland and strong in case of sample from Switzerland. It furthermore confirms a huge difference between those business contexts. Next, the regression analysis with moderator was performed in order to verify the hypotheses H2 and H3. The results of the analysis are presented in table 6.

**Table 6.** Regression analysis results

<i>Model description</i>	<i>Model F stats</i>	<i>R<sup>2</sup></i>	<i>Delta R<sup>2</sup></i>	<i>Moderator coeff.</i>	<i>t Stat</i>	<i>P Value</i>
Employees' commitment,				0.9577	7.7618	0.001
Business context,				2.6384	13.935	0.001
Moderator				-0.5227	-7.2973	0.001
<i>dependent v.: results (overall)</i>	279.038	0.417	0.036			

The obtained results allow to verify the cause-effect relation between employees' commitment and management methods quality due to obtained statistically significant and well fitted regression model (in which employees' commitment is a statistically significant independent variable), which is a basis for accepting H2 hypothesis. Moreover, that business context is a statistically significant moderator of the relation between employees' commitment and management methods quality ( $p < 0.001$ ), which allows to accept the hypothesis H3.

#### 4.4 Discussion

The performed empirical research is a basis for positive verification of employees' commitment influence on management methods quality, which occurs in case of both analyzed business contexts. However, in case of polish organizations (from less developed economy), the strength of the analyzed relation is much lower than in case of swiss organizations. It confirms the assumption that the analyzed relation is much more significant in more developed economy. In the light of U Mann – Whitney statistical test it can be furthermore confirmed that assumed reasons for that fact were correct - employees' commitment and quality of implemented management methods is generally assessed much higher in organizations from more developed economy. Moreover, the analysis confirms that business context is a significant moderator of the confirmed cause-effect relation between employees' commitment and management methods quality.

## 5 Conclusions

The main aim of the article was the analysis and verification of potential influence of employees' commitment on quality of management methods implemented in organization with regard to different business contexts. The empirical research performed among more than 1000 organizations from Poland and Switzerland allowed to verify that employees' commitment is statistically significantly influencing quality of management methods used in organization. Moreover, business context is significantly moderating that relation. The level of economy development is strengthening the employees' commitment influence on management methods quality, especially in the aspect of results connected with employees, which is consistent with assumptions.

The performed research has some limitations – only two countries were selected as the examples of business contexts. It requires further verification. Moreover, the quality of all management methods used in organization (in general) was analyzed and it seems that there might be significant differences between different management methods. It seems to be a valid topic for further research.

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## Students' Perception of Ideal Work – an Agribusiness Sector Case Study

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**Abstract.** The article is a continuation of the authors' research on the relationship between the level of education and perception of agribusiness as an area of ideal employment and career development. The aim of this research part is to analyse the changes in the students' opinions depending on the level of education they have achieved (first-cycle studies and second-cycle studies). A detailed analysis included 29 descriptors defining ideal work, as well as the perception of work in the agribusiness sector as the target workplace. The factographic material was collected by means of an auditorium survey, which proved effective in the course of earlier studies. The data that was collected underwent factual verification and statistical analysis. Based on the study, it was concluded that in the students' opinion, the qualities of ideal work should include the following: congruity with one's interests, feeling proud to do this work and achieving economic satisfaction. A welcome feature of ideal work is also friendly atmosphere at the workplace and the possibility to use the knowledge gained over the school period. The research indicated a change of career plans related to the agribusiness sector, i.e. a stronger tendency towards perceiving it as a stage in developing further career.

**Keywords:** Career, Agribusiness, Ideal Work, Perception of Work in Agribusiness.

### 1 Introduction

Both economic theory and economic reality paradigm in building the intellectual capital as a pacemaker development of regions and countries becomes a factor in determining the pace and level of economic development. As assumed by the signaling theory build by Spence [23] the education confirmed by the diploma of graduation acts as one of the main criteria for recruitment and selection of candidates for work [6, 21, 23]. From this point of view being a university graduate is also the information about the probably high level of skills and competences of candidates for work.

An interesting issue of the employee market is the recognition and assessment of students' attitudes as regards perceiving their future work, particularly in agribusiness. Graduates of agricultural and agricultural-economic profile universities realize that a predominant group of future workplaces are connected with agriculture and food economy [6, 5, 13, 14].

The cognitive value of this study is to emphasize the role of knowledge needs and its absorption by agribusiness and noticing the specificity of the so-called Generation Y, which entering the labor market becomes the carrier and recipient of this knowledge [4]. Potentially, the employees from this group are mostly young people, born after 1980, growing up in the market economy conditions, in the times when modern technologies were rapidly developing. The students -graduates are also representatives of this generation. For them the digital world is not only an obvious source of information, but also a way of spending time and building social relationships [18]. In contrast to their predecessors, they are less fitted into the reality of the physical sphere of economic processes, but they are inclined to support their work with knowledge, which directly results in the increasing innovativeness of the sectors where they find employment. Their functioning on the labour market reflects the unavoidability of the socio-economic changes taking place not only in agribusiness, but in the whole economy. It has become a challenge for universities responsible for the education of high quality employees, also for agribusiness [5]. Undoubtedly, graduation is a valuable element of building individual intellectual capital. It also gives graduates a better chance of finding a job. In economic practice, especially in agribusiness, the importance of individual intellectual capital of job candidates is still not sufficiently appreciated. However, this is only one of the reasons causing difficulties in finding employment after completing academic education.

The demand for the knowledge contributed by the graduates to the sector is huge, and the human resources training system in Poland correspond to the needs that are reported [3]. It turns out, however, that the constantly deficient supply of highly qualified employees can be related to the graduates' attitudes.

The research conducted by the authors in 2016-2018 seems to confirm this statement. The aim of this paper is to present selected descriptors of ideal work, which are essential to students. The study also presents students' attitudes towards setting up their own businesses as well as treating employment in the agribusiness sector as a stage in the future career.

## **2 Materials and Methods**

To achieve the aims of the study, the authors made a literature review and conducted a questionnaire survey. They used the auditorium questionnaire method, which is considered to be particularly useful in research conducted among students. The authors adapted the questionnaire used for HoReCa sector studies [1]. The respondents evaluated the total of 29 qualities defining five dimensions of an ideal workplace: work contents, economic benefits, development opportunities, social relations and reputation. In addition, the study included issues connected with the attractiveness of the agritourism sector as a place of work for the students of the Poznań University of Life Sciences.

The survey was conducted in December 2016 among the final term first-cycle studies students of animal science (zootechnics) before their graduation exam. It was repeated among the same students in June 2018 before their final second-cycle studies

before their graduation exam. Participation in the study was voluntary and anonymous. The empirical material that was collected underwent preliminary evaluation, followed by a statistical independence analysis, using STATISTICA 13.1. The study presented herein is a continuation of the authors' research started in 2016 [8, 9, 10, 22].

### 3 Results and Discussion

The survey was conducted on a sample of thirty seven first-cycle studies students (54.4% of students at the year) and eighteen second-cycle studies students (54.4%). In both cases, the majority of each sample were women. The study showed that every third respondent was planning to set up their own business just after finishing university. The results indicate that the respondents are planning to take their future career path into their own hands.

In the course of the study, the students were asked to evaluate 29 features defining their ideal work. The authors used the 7-point Likert (priority) scale, where 1 signified "not a priority", 4 signified "neutral" and 7 - "essential priority". The results are presented in Table 1.

**Table 1.** Perception of the image of ideal work.

No.	Descriptors	First-cycle studies (n=37)		Second-cycle studies (n=18)	
		Mean	Standard deviation	Mean	Standard deviation
1	Work according to interests	6.51	0.74	6.83	0.71
2	Work which is challenging	5.49	1.15	5.72	1.56
3	Gives an opportunity to fully use the acquired knowledge and skills	6.24	0.98	6.72	0.57
4	Ensures a considerable diversity of tasks	6.08	0.98	6.17	1.54
5	Gives an opportunity to decide how you wish to perform your duties	6.11	0.99	6.11	1.08
6	Involves a large number and fast pace of performing duties	4.89	1.24	4.50	1.82
7	Involves flexible working time	3.62	2.27	4.00	2.14
8	Involves mobility	3.92	1.91	4.17	2.31
9	Easy access by transport	5.70	1.45	5.78	1.83
10	Is done in an attractive destination	5.08	1.62	6.39	0.78
11	Guarantees high remuneration	6.32	0.88	6.39	1.20

12	Offers a wide range of social benefits	5.81	1.33	5.83	2.07
13	Provides modern equipment necessary to perform work duties	5.51	1.24	6.28	1.45
14	Offers stable employment conditions	6.14	1.29	6.50	1.04
15	Gives the employee the possibility to influence the decisions important for the company	5.41	1.54	5.72	1.53
16	Ensures a clearly set career / promotion path	5.86	1.46	5.94	1.80
17	Gives the possibility to raise qualifications	6.11	1.13	6.50	1.25
18	Provides the possibility of long-term professional development at a given company	5.83	1.40	6.44	1.25
19	Guarantees learning skills useful at other workplaces	5.59	1.34	6.44	0.70
20	Allows the employee to combine work duties with private life	5.92	1.40	5.83	1.72
21	Friendly atmosphere at the place of work	6.32	1.13	6.78	0.73
22	Ensures respectful treatment by clients and co-workers	6.24	1.21	6.39	1.04
23	Gives a sense of support from co-workers	6.24	1.16	6.44	0.86
24	It is performed together with competent co-workers	6.11	1.26	6.22	1.06
25	Gives a sense of belonging and integration with the team	6.16	0.99	5.78	1.44
26	Involves offering high quality products/services	5.57	1.46	6.11	1.18
27	Enjoys considerable social prestige	5.32	1.40	5.61	1.69
28	Gives a sense of pride with performing work duties	6.38	0.98	6.56	0.70
29	Work is done at an enterprise which serves the local community	4.62	1.60	4.00	2.22

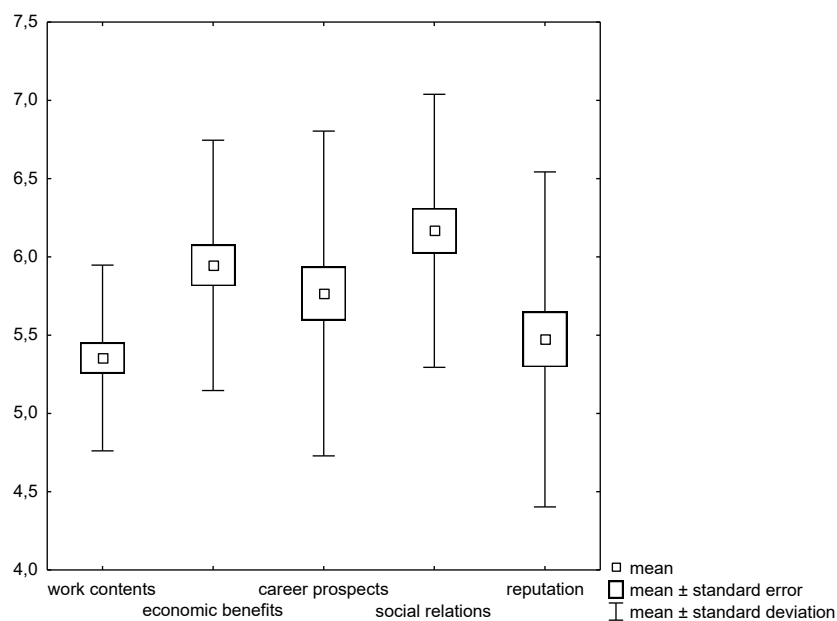
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The analysis of the results showed that in the opinion of the first-cycle studies students, ideal work should match their interests (6.51), provide them with a sense of pride with their duties (6.38) and guarantee high remuneration (6.32). At the same time, the three most important qualities of ideal work mentioned by the second-cycle studies students included matching their interests (6.83), friendly atmosphere at the workplace (6.78) and having a job giving an opportunity to make use of the knowledge and skills gained at the university. The second-cycle studies students put high remuneration at the 10th place, allocating it 6.39 points. The descriptors which were least important for both groups of respondents included: (6) the fast pace of fulfilling one's responsibilities, (7) flexible working time, (8) mobility and (29) a job at an enterprise working for the benefit of the local community.

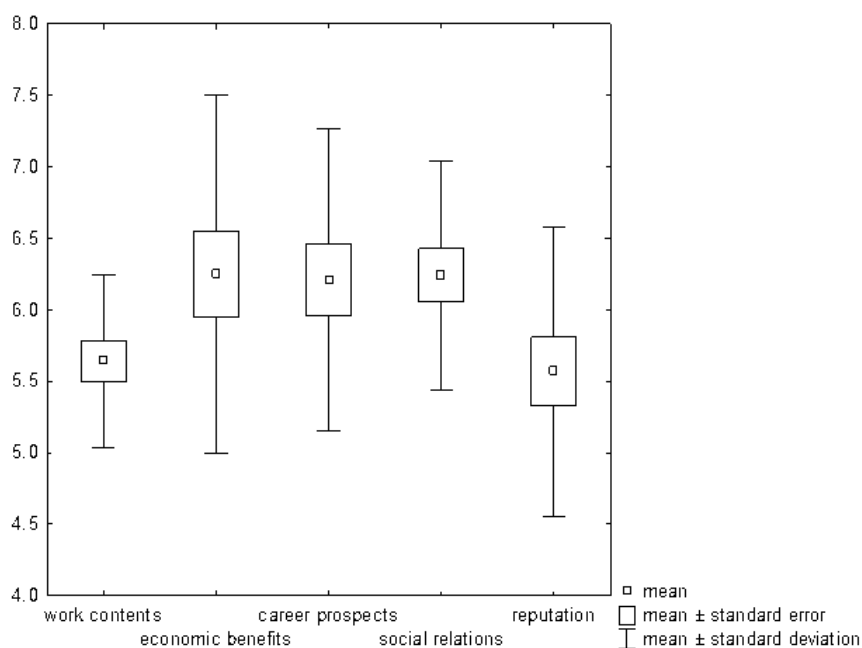
In order to check whether the points allocated to individual qualities vary depending on the level of studies, the authors applied the U Mann-Whitney test and a test from the Wald-Wolfowitz series. The results of the former clearly pointed to a statistically significant ( $p < 0.05$ ) differentiation of the allocated points in the case of seven descriptors: 1, 10, 13, 17, 18, 19 and 21. The other test indicated statistically significant differentiation of the allocated points in the case of four descriptors: 7, 9, 12, 21. Based on the results that were achieved, it should be concluded that the respondents differ most in their evaluation of the features connected with career development opportunities.

In the further part of the study, the analysed qualities were aggregated into five variables: work contents (1-10), economic benefits (11-14), career prospects (15-19) social relations (20-25) and reputation (26-29), using the arithmetical mean of the descriptors. The results of the aggregation are presented in Figure 1 and Figure 2.

Analysing the results presented in these charts, we can clearly see that the calculated mean values for individual variables differ one from another. It was also confirmed by the Kruskal-Wallis test ( $p < 0.01$ ) in both groups of respondents. More detailed analyses showed that a statistically significant differentiation of the allocated points regarded only the mean values for the economic benefits variable (U Mann-Whitney,  $p < 0.05$ ); in the remaining cases a significant differentiation was not observed.

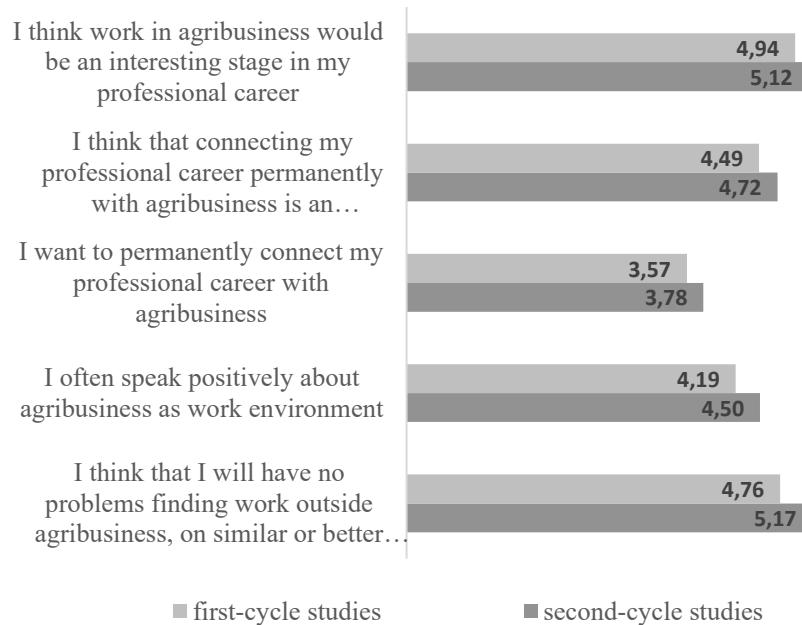


**Fig. 1.** Students' expectations as regards an ideal workplace after completing first-cycle studies.



**Fig.2.** Students' expectations as regards an ideal workplace after completing second-cycle studies.

At the last stage of the study, the students were asked for an opinion about the attractiveness of work in the agribusiness sector (Fig. 3). Undoubtedly, agribusiness is a rapidly growing sector of business initiative in many countries around the world [11]. The respondents tended to agree with the statement that work in agribusiness would be an interesting stage in their career rather than the target permanent workplace.



**Fig. 3.** Attitude to connecting career with agribusiness.

The respondents perceive agribusiness as a potential workplace as they express positive opinions about this sector. However, a great majority believe that they will easily find work in other sectors. The results achieved in this research corresponds to the results of other authors. They analyse the job offer of agribusiness addressed to the students from various point of views, i.e. industry [20], the existing education system [12], or from the student's perspective [19, 19]. They are also the part of another studies related to the students possessing or not the required competences [7]. It should be noted that the similar research is also carried out by scientists from other countries, eg Sweden, USA [2, 13, 14]. However, existing surveys largely ignore the agribusiness sector as a potential workplace for graduated.



## 4 Conclusions

Despite the relatively effective system of vocational education and higher education, the demand for qualified workers generated by the agribusiness sector still remains unsatisfied. The causes of this situation should be sought in the attitudes of university graduates, i.e. the prospective employees, whose opinions about work in this sector are highly diversified. It is related to an imagination of the first, ideal work, as well as the perception of agribusiness as a stage in career development. The research that was conducted showed that graduates highly evaluate work in the sector, but they tend to agree more with the statement that it would be an interesting stage in their career rather than the target permanent workplace. This opinion was expressed by both, first- and second-cycle studies students.

As regards perceiving work as ideal, it was interesting to observe that second-cycle studies graduates value work which matches their interests, friendly atmosphere at the workplace, and a job which gives them an opportunity to use the knowledge and skills they have gained at the university more than economic benefits. Such a hierarchy of qualities is an optimistic forecast for the agribusiness sector, as it indicates that the studied group of potential employees are going to engage in work in agribusiness for reasons other than financial, which are among the strongest motivators of human activity.

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## Diversity Management Practices in the US Tech Companies

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**Abstract.** The paper's aim is to present how technology companies from Silicon Valley manage diversity after the presidential elections in the US. Also, the paper shows what HR practices on managing diversity are applied across the technology start-ups and what management measure have been taken to tackle diversity in the context of social sustainability. In the paper are used queer theory and the social constructivism as an approach to managing diversity in twenty first century. Furthermore, diversity reports of the technology companies have been analyzed from Silicon Valley. The data sample represents set of ten technology start-ups and different dimensions of diversity have been collected. Subsequently, statistical operationalization has been applied to reveal the links between HR practices and diversity dimensions across the start-ups. The paper argues that majority of the selected technology companies still have diversity deficiencies in terms of diversity in the top management teams. Other paper findings state that the tech companies are making slow steps towards tackling diversity internally. The study provides with applications for tech companies on what HR practices to use and how to sustain amid fierce political decisions and turbulent business environment. Also, the tech sector will benefit from recommendations on handling with diversity. The paper contributes to the queer theory in terms of approaches for managing diversity in the conditions of high innovations and changing governmental policies. The paper possess value to the policy makers and top managers in the Silicon Valley in terms of approaches how to manage diversity.

**Keywords:** Diversity Management, Queer Theory, US Tech Companies.

### 1 Introduction

Scholars and practitioners on diversity and inclusion claim that businesses and firms, which are having particular interest in high competitiveness and sustainability nowadays should invest more in managing diversity and inclusion. There have been calls for more diversity across numerous industries lately: movies, TV, sports, publishing, and more. Discriminatory hiring practices are not a thing of the past, as many of us would like to believe. Although movements like to rectify discriminatory

behavior and hiring practices, leaders across every industry must still spearhead new solutions to make their fields equal, accessible, and safe.

One industry where the need for diverse representation and hiring is apparent is technology. Technology impacts and is used by us every almost hour of every day. Currently, men hold 76% of technical jobs, and 95% of the tech workforce is white (see Figure 1) [2]. There are so many new ideas and developments living in the brains of people who have not been given a chance to act on them, so why let technology be created by limited points of view? We need to add depth to the pool from which tech is born, for everyone's benefit.

Tech companies control almost every facet of daily life, from how we communicate to the ways in which we travel and, even, how we buy our groceries. Their power is seemingly infinite, which is all the reason more why they must make a concerted effort to champion diverse voices from within. Recently Forbes has conducted research on diversity in the US, where the report states that "The people creating this technology have the power to influence how it works, and that's too big a responsibility for any single demographic to have full control. A lack of diverse ideas and representation could lead to further disparities between gender, race, and class." [2].

### **1.1 Diversity in the US Tech Companies**

Nowadays many business sectors as the tech business are coming across barriers and hurdles when it comes to managing diversity and inclusion. Moreover, in the modern world of 21 century the companies are employing wide variety of workforce in terms of ethnical background, religion, age and other dimensions of diversity as they have to tackle demanding customers from all over the world. Along with that these organizations should manage strategically diversity throughout all hierarchical levels of the organization and across all branches geographically.

At the same time the tech companies are questioning themselves why there is such a big pressure to manage diversity. In the tech companies the employees supposed to perform quite well in order to survive retention and long-term success, but at the same time these workers would like to make sure that the top management will appreciate and reward their performance. They would like to be treated equally, but at the same time they would like to see that their employers approach them personally and create very good conditions, so they can perform well. Accordingly, the companies should meet the business requirements and ultimate objectives. It means that tech companies should possess quite broad mindset, which enable them to tackle the diverse workforce regardless differences among the employees. At the same time, the tech companies should apply managerial practices on diversity and inclusion, which will create win-win solutions. Also, diversity management practices are used for increasing employee's well-being and work-life balance, which is vital nowadays in order to avoid burn out. For instance, diversity and inclusion is a one of the main topics from organizational culture, which has been discussed among the tech companies from Silicon Valley.

For example, diversity is a central theme of the culture across Netflix, as well as Google [1].

When it comes to employing barriers and hurdles, the tech companies often face difficulties to keep the minority employees, which is quite well demonstrated in many tech companies in Silicon Valley. There the minority workers feel oppressed and under minded, because they are quite different from the majority white workers. They don't feel welcome at the table and they wonder if anyone understands or supports them. For minority employees it could be quite stern to stay in such a kind of job for a long period of time. According to the Queer theory, employee personality is a social construct, which is changing during the life [7]. Therefore, Diversity dimensions should be analyzed through the lenses of social constructivism, where the identity of the employees is similar to fluidity [3].

**Table 1.** Diversity Management Measures in the US Tech Companies.

Company Name	Gender	Age	Disabilities	Minorities	Sexual Orient.	Religion
Google	X	X	X	X	X	-
Netflix	X	X	X	X	X	X
Buffer	X	X	X	X	-	X
Asana	X	X	X	X	X	X
Clef	X	X	X	X	-	-
Facebook	X	X	X	-	-	-
Alphabet	X	X	X	-	-	-
Apple	X	X	X	X	X	X
Biogen Idec	X	-	-	-	-	-
Actavis	X	X	X	X	X	X

On the surface, quotas sound like a good solution because they increase the number of employees with underrepresented backgrounds in the workplace. But, on a fundamental level, focusing exclusively on hiring and retention numbers is counterproductive. When diversity and inclusion are reduced to data points, it strips the human element from the business. Rather than evangelizing a recruitment approach based on a balanced cultural understanding and the exposure of candidates to an inclusive and egalitarian workplace, execs and HR leaders find themselves glued to spreadsheets and diversity reports [4]. In the paper, we shed a light on the following research questions, which need to be researched:

What Managerial best practices the Tech companies should develop in order to tackle better diversity?

What are the key diversity dimensions, which need to be addressed on National and Federal levels in the US?

## 1.2 Strategies for Increasing Diversity

While employment opportunities in the technology sector have grown at twice the rate of the national average, high-tech firms have struggled to increase diversity within the workplace. Data compiled from voluntary disclosures to the EEOC reveals large racial and gender disparities within tech workforces as compared to the private sector overall. Recent studies show that improving ethnic and gender diversity within the technology workforce presents an economic opportunity that could result in as much as \$570 billion in new value for the tech industry, and could add as much as 1.6% to the national gross domestic product. With a new analysis of challenges to diversity in the tech industry, it is an ideal time for employers to evaluate diversity initiatives currently in use.

**Table 2:** List of US-based Tech companies having Diversity and Inclusion Measures (N = 10).

Company Name	Diversity & Inclusion Measures	HQ's Location
Google	Yes	US
Netflix	Yes	US
Buffer	Yes	US
Asana	Yes	US
Clef	Yes	US
Facebook	Yes	US
Alphabet	Yes	US
Apple	Yes	US
Nvidia	Yes	US
Microsoft	Yes	US

## 2 Methodology

In the paper is collected secondary data from the top ten Tech US companies from Silicon Valley with operations in the US and out of US. The US Tech companies are among the top in the Silicon Valley in terms of number of employees, number of branches abroad, profit per one employee and sales growth [5]. The data has been gathered from the companies' websites-section Diversity and Inclusion, their code of conducts and from other secondary based sources as Oracle Database, Fortune 2000 and Thomson Reuters One. In the paper we have gathered the following information: existence of solid and rigorous diversity management strategy and corresponding managerial practices regarding gender, age, sexual orientation, (dis)ability, religion and ethnicity. We have limited the exploration to those diversity dimensions which are covered by the US Federal diversity legislation. In the paper the companies' websites, code of conducts and other secondary based sources have been analyzed in terms of diversity management measures.

According to the Queer Theory, we have withdrawn two hypotheses in the paper as follows [7]:

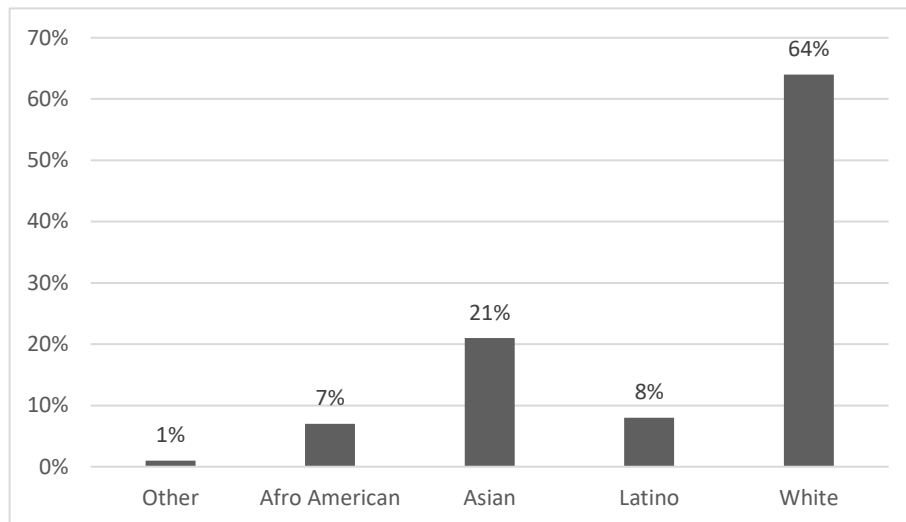
**Hypothesis 1:** Diversity dimensions such as sexual orientation and religion have emerged in recent years among the Tech companies in Silicon Valley in the US.

**Hypothesis 2:** Sexual orientation and Religion dimensions are still taboo in few Tech companies in Silicon Valley in the US.

### 3 Results

Tech has cultivated a reputation as one of the world's most progressive and forward-thinking industries. The Tech companies still have a long way to go, but hopefully that the industry can provide a model for other industries to follow in the area of diversity and inclusion.

To get there, the Tech companies need to move beyond tokenism and get serious about weaving diversity into the fabric of companies' corporate cultures.



**Fig. 1.** Diversity in the US Tech Companies by Ethnicity.

Even though diversity dimensions are quantified, they don't create any change. Nowadays, diversity and inclusion are considerably scarce from majority technology companies' missions. It needs some measures to be taken by the top management of these companies. When you manage diversity into organization's mission and core values, it steers the company's vision and actions. As a result, customers and other stakeholders understand that diversity is an essential component of company culture. Furthermore, we can observe that still the tech companies in Silicon Valley are managed mainly by white males and that these companies do not apply management practices to the diversity dimensions as sexual orientation or religion (Figure 1).

## 4 Discussions

We have analyzed firms' ethical codes and diversity and inclusion reports along with their companies' websites on diversity and inclusion, we are able to withdraw mitigation in the ways how the tech companies are coping with diversity. Vast of the Tech companies from Silicon Valley are putting a lot of efforts and money on Diversity management instruments for improving best practices on diversity and inclusion matters. Along with this there is much of data on how firms supposed to act on diversity characteristics such as sexual orientation, LGBTI rights, etc. This is triggered by the fact that in Silicon Valley there are quite few companies, which develop advanced rules, directives and regulations on coping with diversity and inclusion matters such as age, gender, disability, LGBTI groups in many of the companies there are official regulations, directives or normative documents, which are dealing with diversity dimensions such as sexual orientation due to the fact that there is particular pressure from different authorities and business to be published and announced diversity and inclusion policies [8].

Scholars and practitioners on diversity management have dedicated a lot of time in Western World to show what best practices and approaches have been applied when it comes to organizational culture. In the modern world of globalization and internationalization the countries from Western Europe and North America possess multicultural environment. Similarly, the same phenomenon is valid for the Silicon Valley, where the residents are coming from different ethnical, religious and cultural parts of the Worlds and thus the level of diversity is high [6].

When it comes to nationality, religion, ethnicity, sexual orientation and other diversity characteristicly representations. Known nowadays to the practitioners and academicians is the fact that diversity and inclusion are values and aspects pertaining to the Western World but parallelly based on the previous studies and retrospective tracking combined with postcolonial perspectives this phenomenon is emerging [9].

It is proved that there is scarce of data on management practices regarding diversity and inclusion on companies - web-based apps and only several tech companies announce data on trainings and programs for tackling diversity and inclusion in the headquarters.

## 5 Conclusion

Issues regarding diversity and inclusion are not static. Employers may need to periodically revisit diversity initiatives and goals. By utilizing empirically supported activities, however, employers can fine-tune initiatives to progress towards a more diverse workforce.

All in all, companies are on the market in order to serve customers, and they reflect the values of the people they count on to make successful stories. The individualistic approach of firm's business should involve employees from a diverse range of backgrounds - alive, breathing human beings who are more than numbers or ticked boxes. By bringing everyone to the table and working to incorporate diversity and



inclusion into the fabric of your company culture, you can take an important step toward abandoning tokenism and creating an industry we can all be proud of.

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## Labour Productivity and Competitiveness of SMEs in Food Industry

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**Abstract.** Labour productivity is considered a significant factor influencing the long-term competitiveness of enterprises. The paper focuses on the link between productivity of labour and competitiveness of Czech SMEs in the food production. The research was focused on 160 Czech companies in food industry. Competitiveness is expressed through selected financial indicators (Return on assets, Return on Sales, Current Liquidity, Altman - ZETA model, model IN05). The relationship between labour productivity and selected competitiveness indicators were examined through correlation and regression analysis. It has been found that the link between labour productivity and competitiveness depends heavily on defining indicators for competitiveness. The strongest correlation was found between labour productivity and competitiveness expressed by indicator return on sales. To measure the competitiveness of SMEs indicators of profitability appear to be the most appropriate, namely the indicator of ROA and ROS. The importance of labour productivity is increasing due to high wage growth which can lead to losing competitiveness for Czech enterprises.

**Keywords:** Competitiveness, Labour Productivity, Food Industry.

### 1 Introduction

The term competitiveness has recently become a very often used term in economics and management. Competitiveness is monitored at the level of states, regions, sectors and companies. As one of the key factors influencing competitiveness is often cited labour productivity, both at the macroeconomic level and at the enterprise level. The purpose of this article is to explore the relationship between labour productivity and competitiveness of Czech SMEs in food industry.

The competitiveness of an enterprise results to a large extent from the competitive advantage that the firm has, but which is neither absolute nor permanent. Grant [6], defined a competitive advantage as the ability of a company to achieve a higher profitability than a competitor on the market.

Competitiveness can be distinguished on two levels:

- macroeconomic level (competitiveness of countries or regions)
- enterprise level (business competitiveness)

The competitiveness at the macroeconomic level OECD [14] defined such as the capability to make products which can succeed in international competition. Microeconomic competitiveness is in the centre of countries or regional competitiveness. Usually, it is defined as capability of company to compete successfully in a market, to grow and to be profit table in a long run. The most important definition of competitiveness is at enterprise level for the purposes of this article. The enterprise-level competitiveness is as the ability to produce and sell a particular product under the condition of maintaining profitability [8]. The product is successful if it delivers value to a customer that is determined by the manufacturer's overall profitability (efficiency) with which the product is produced. Many approaches can be used to measure a business's competitiveness. Currently, two major systems are being used to measure competitiveness: financial-based systems and systems based on the application of non-financial indicators [17]. The combination of these systems is ideal. In business practice, a large number of different financial analysis indicators or indicators are used to measure competitiveness, depicting the economic situation of the company.

Productivity we can generally defined as the ratio of output and input. We have labour productivity, capital productivity and total factor productivity. The labour productivity is linked to the production efficiency of labour and it is the typical indicator to measure single productivity of factor [13]. Labour productivity can be measured at the macro and micro level. Labour productivity we can calculate as gross domestic product per employee [2] or value added per labour cost or worked hours. Labour productivity is influence by many factors as sector [1], enterprises age, innovations [9], size of firm [3], region [4,20], country [18] business cycle [11]. It is necessary for SMEs to monitor their productivity and competitiveness. Small and medium-sized enterprises are source of economy growth, generator of development, innovation and regional growth [10]. The labour productivity of SME is influenced by many factors: human capital, management style [19] or innovations. Nowadays innovations are necessary in the labour market to increase the flexibility of employees on the labour market [15].

## **2 Data and Methodology**

The paper deals with the link between labour productivity and competitiveness of Czech SMEs in food industry – food production. The article was focused on firms (160) categorized according to the EC (Commission Regulation no. 800/2008) as small enterprises, micro enterprises and medium enterprises. The main orientation of these companies in the food industry. The source of data for article was the firms database Albertina. Data were from the 5-year period (2012-2016).

The indicators of firms' labour efficiency and competitiveness were analysed in companies. The chosen indicator of labour efficiency (productivity) was ratio value added and labour costs. The chosen competitiveness indicators were: Return on Assets ( $ROA = \text{profit before interest and taxes (Ebit)} / \text{total assets(TA)}$ ) [15], Return

on Sales (ROS = net firm profit/ sales), Current Liquidity (current assets/current liabilities, model IN05, model Altman-ZETA).

Index IN05 was used in the form:

$$IN05 = 0.13x_1 + 0.04x_2 + 3.97x_3 + 0.21x_4 + 0.09x_5 \quad (1)$$

where:

$x_1$  – assets (TA) / debt,

$x_2$  - profit before interest and tax (EBIT) / interest cost

$x_3$  - profit before interest and tax (EBIT)/ assets total (TA)

$x_4$  - revenues (TR) / assets total (TA)

$x_5$  - current assets (CA) / short-term liabilities [7]

Altman ZETA model was used in form:

$$Z' = 0.717x_1 + 0.847x_2 + 3.107x_3 + 0.420x_4 + 0.998x_5 \quad (2)$$

Where:

$x_1$  - working capital (WC) / total assets (TA)

$x_2$  - retained earnings (RE) / total assets (TA)

$x_3$  - EBIT (earnings before interest and taxes) / total assets (TA)

$x_4$  - market value of owner's equity /book value of total liabilities,

$x_5$  - sales (TR) / total assets (TA) [16]

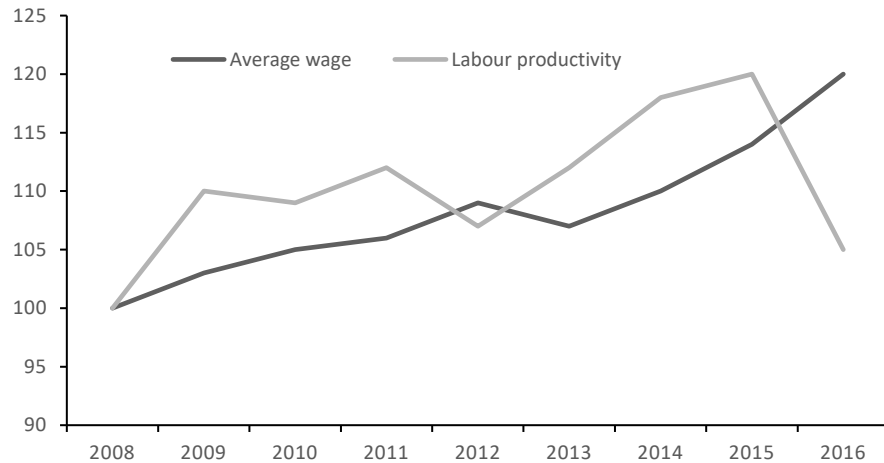
### 3 Results

The manufacturing is an important part of the Czech economy and at the same time a key sector for technology development, knowledge innovation and job opportunities. The share of the manufacturing industry in the creation of gross value added in 2016 reached in Czech Republic 27.1%. It is country with the second the highest portion of the manufacturing industry in gross value added within the European Union. In the Czechia, as well as in the EU, the food industry belongs to the key sectors of the processing industry. In the food industry, a large proportion of employees employ 9% of employees, but account for less than 4.5% of sales and value added. The most important group is medium-sized enterprises, which generate 45% of the volume of sales and value added within the food industry. The whole sector participated in the Czech Republic's employment by 2.56% in 2016, recording a year-on-year decline of 0.5 percentage points, yet it is a significant employer, similar to the European Union [12].

#### 3.1 Labour Productivity

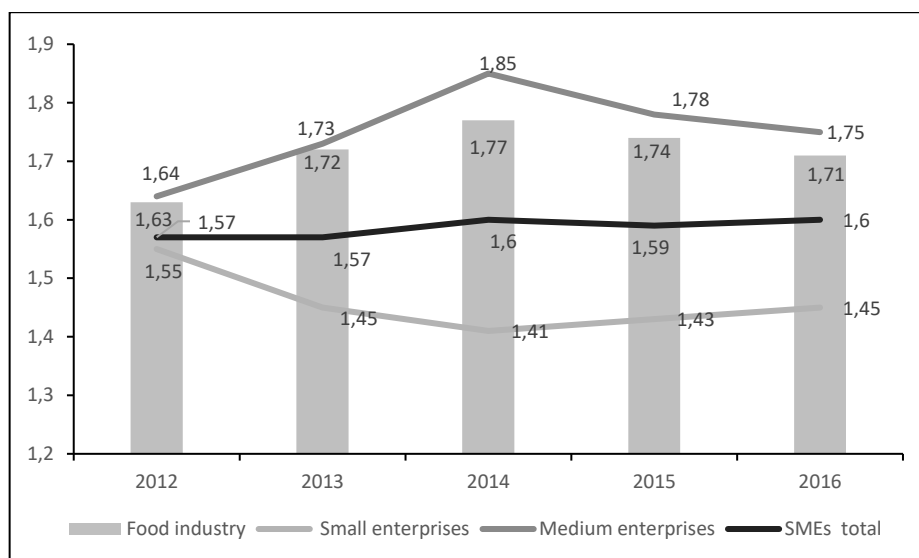
The labour productivity and average wages have been steadily rising over the period under review, as shown in Figure 1. The number of Czech food enterprises has increased, but the number of employed persons is declining. Revenues and value

added showed a staggering trend over the review period, with small changes between years. In the last two years, increase more average wages than labour productivity.



**Fig. 1.** Development of labour productivity and average wages in the food industry between 2008 and 2016 (2008 = 100%).

The business analysis focused on SMEs that are oriented to the food production for the period 2012-2016 (5 years). In total, there were 160 SMEs. The share of small enterprises was 55% and medium enterprises 45%. Productivity in monitored enterprises. The labour productivity computed as the share of value added and labour costs in absolute terms. Figure 2 shows an apparent initial decline in labour productivity for small businesses between 2012 and 2014, which was followed by growth up to 2016, but it should be noted that at a slower pace. The labour productivity for small businesses remained below the food industry average throughout the reporting period.



**Fig. 2.** Labour productivity (CZK) in the period 2012-2016.

Looking at the productivity development of small and medium-sized enterprises together, a more stagnant trend can be noticed. This suggests that the decline in labour productivity for small businesses between 2012 and 2014 was offset by the rise in labour productivity among medium-sized enterprises over the same period. A similar opposite trend can be observed between 2014 and 2016, on the contrary, the fall in labour productivity of medium-sized enterprises has been offset by labour productivity growth in small businesses. The labour productivity value of SMEs remained below the food industry average throughout the reporting period.

**Table 1.** Labour productivity growth rate (%) in 2012-2016.

Period	Small	Medium	SMEs total	Food industry
2012/2013	-6.66	7.56	-0.56	5.56
2013/2014	-2.19	6.78	2.3	2.47
2014/2015	1.32	-3.7	-0.72	-1.51
2015/2016	1.48	-1.73	0.48	-1.49

It is suitable to compare the labour productivity (LP) growth rates in medium-sized enterprises and the whole food industry (Table 1), where similar labour productivity developments in medium-sized enterprises operating in the food industry can be observed compared to the productivity development of the entire food industry. If the productivity of the food industry grew, the labour productivity of medium-sized

enterprises grew, as well as the decline in labour productivity across the food industry, and the productivity of work in medium-sized enterprises

### 3.2 Labour Productivity and Competitiveness

This part of the article analyses the relationship between firms labour productivity and competitiveness, where competitiveness is expressed through selected financial indicators (ROA, ROS, Current Liquidity, Altman - ZETA model, Czech model IN05). The link between labour productivity and selected competitiveness indicators is examined through correlation and subsequent regression analysis, both depending on the size of the enterprise and regardless of size.

**Table 2.** The results of correlation analysis.

	n		ROA	ROS	Liquidity	IN05	Altman ZETA
SMEs total	N=765	LP	0.37*	0.53*	0.15*	0.27*	0.22*
Small enterprises	N=426	LP	0.37*	0.51*	0.30*	0.35*	0.38*
Medium enterprises	N=337	LP	0.57*	0.55*	0.02	0.21*	0.18*

\* statistical significance at the 5%

The strongest correlation was found between labour productivity and competitiveness expressed as a return on sales (Table 2). The correlation coefficient ranged from 0.51 to 0.55. If, therefore, the productivity of businesses in the food industry has increased, productivity gains have increased, and competitiveness has grown. Another significant positive correlation was found between labour productivity and competitiveness measured by the ROA. Weak weaknesses were then found between labour productivity and liquidity indicator, IN05 and Altman-ZETA. We can expect that other factors influencing the competitiveness of firms are likely to be affected here.

## 4 Conclusion

The paper focuses on exploration of the link between labour productivity and competitiveness of Czech SMEs in the food industry. It has been found that the link between labour productivity and competitiveness depends heavily on defining indicators for competitiveness. To measure the competitiveness of SMEs in the food industry, indicators of profitability appear to be most appropriate, namely the indicator of return on assets and return on sales. If SMEs want to increase their competitiveness and increase their performance, they can do so by increasing labour productivity. On the other hand, research of Firlej shows that it will be desirable to increase expenditures on innovations to the firm in food industry oriented on enhancement of labour productivity and product quality [5]. With this conclusion we

can agree due to high wage growth which can lead to losing competitiveness for Czech enterprises in food industry.

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## Common Areas of Smart Specialisations as well as the Innovation Potential and Possibilities of East Poland Voivodeships

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**Abstract.** In East Poland voivodeships as poorly developed regions the outlined areas of smart specialisations pertained mainly to building the competitive advantage based on traditional sectors lacking in innovation. In the remaining highly developed regions, smart specialisations were more frequently based on innovative sectors and on increasing competitiveness through the increase of innovation. The regional strategies of smart specialisations are an instrument of building the regional consensus for the development of entrepreneurship. Their task is also to find specific sectors of regional economy that are important and give potential opportunities for development. The task of authorities acting for implementing the regional innovation systems is to cooperate with companies and business-related bodies with the aim of providing help to entrepreneurs with absorbing EU funds. The effects of implementation of the regional innovation systems largely depend on institutional effectiveness of the self-government administration involved in that process.

**Keywords:** Smart Specialisations, Innovation, Region.

### 1 Introduction

The strategy for smart specialisation constitutes the basic component of the European Cohesion Strategy in relation to the regions. The recommendations of the European Union pertaining to specifying fields and sectors deciding about the competitive advantage and the growth potential of a country and its regions are connected with a new approach to a more effective financing of innovation in years 2014–2020 [2]. Identifying strengths and weaknesses of regions within the smart specialisation strategy conditions the possibility of using EU funds in the current financial perspective. Implementing regional innovation strategies for smart specialisations (RIS3) is connected with undertaking actions in identified areas of science, economy constituting the development potential of regions, the aim of which is to increase the competitiveness and innovation of a voivodeship economy [9]. A characteristic feature of regional innovation systems is that they are rooted in the regional environment. A fundamental role in the process of building the innovative capacity of regions is played

by regional policy which constitutes the plane that binds the actions of individual items of the regional innovation scene. In that process, self-government authorities mainly play a supportive function and coordinate pro-innovation behaviours and actions undertaken in the region [10].

The assumption of RIS3 is to use the endogenous resources of regions deciding about their social and economic development with the consideration of the rules of sustainable development policy [14]. The size of the basic indicators typical for the research and development infrastructure places the East Poland regions last in the country. That determines the possibilities of using the identified areas of smart specialisations in the development of regions and indicates large disproportions in the scope of research and development activities at the regional scale in Poland [15]. Therefore, designing and implementing smart strategies required the participation of various stakeholders, including public administration, the science sector and research bodies, the circle of entrepreneurs and consumers as well as non-profit organisations. It means that a strategy should encompass a public, market and civil paradigm. The result of joint analyses is the vision of the future regional growth confirmed by all stakeholders which includes key targets [17]. The social and economic scenario, worked out jointly, should allow for long-term cooperation of all co-authors of RIS3. The aim of the created vision is the specification of a limited number of development priorities complementary to the identified potential of smart specialization [18]. They include both technological and sector priorities as well as horizontal priorities. An instrument that can be helpful in that scope may be a prepared plan of action including strategic targets, the schedule of works, the sources of financing and a general division of the budget. The system of monitoring and assessing the progress of strategy execution and achievement of set targets is a perfect component of the strategy [6]. Because of that, it is important to indicate non-measurable priorities, including the expected effects and indicators, as well as their initial and target values. In accordance with the assumption made by the European Union, the strategy for smart specialisation should be constantly developed and adjusted to the changing economic realities and the results of monitoring and assessment.

The aim of the article was to identify common areas of smart specializations of East Poland voivodeships which are mainly based on areas connected with natural resources: bio-economy, food, food processing, health. Based on the analysis of programme documents pertaining to the implementation of RIS3 in selected regions of East Poland, a role was presented of individual stakeholders in the process of coordination of RIS3. The results of surveys allowed for the identification of factors conditioning the rules of cooperation between the entities responsible for implementing RIS3, including also undertaking activities for the increase of competitiveness and innovation of those regions. Smart specialisations are based on market knowledge of business and local government entities in connection with the research and development and innovation potential of the region.

## 2 The Essence of the Smart Specialisation Concept

The basic assumption underlying the smart specialisation concept is the increase of innovation and competitiveness of regions on the basis of their endogenous potential and the sectors already existing in those regions. These may include both specialisations within one sector, as well as inter-sector undertakings allowing for achieving a specific competitive advantage [19]. The guidelines of the European Commission in the scope of the so called third generation strategies set an expectation towards the regions regarding the strengthening of smart specialisations basing on the following four mutually related rules (termed as 4 C): choices, competitive advantage, critical mass and collaborative leadership. The aim of that concept is achieving the critical mass in areas and sectors that are key for competitiveness, spreading general application technologies, especially by using them in products and services as well as strengthening local potentials in the scope of innovation activities [20]. With the use of knowledge and the specialised research and development activities considering social and economic features, the regions should achieve perfection in a specific field, which will make it possible for them to increase their competitiveness and innovation, among others by:

- indicating, on the basis of the analysis of strengths and weaknesses, as well as possibilities and directions of growth, several investment priorities in perspective areas of specialisation and building a competitive advantage on such basis,
- greater use of knowledge and combining the possibilities of the R&D and business sectors in the scope of research and development activities with the consideration of social and economic features of a given region,
- creating clusters and space for varied inter-sector connections causing the diversification processes through the participation in above-regional networks,
- engaging scientific facilities, public authorities as well as entities responsible for implementing innovations in pro-innovation processes.

Specific resources of the region integrated in global processes are presently becoming the key success factor. Possessing them conditions the uniqueness of regional space and should be perceived both as the basis for endogenous growth and a natural competitive advantage [1]. The leading regions may invest in improving general technologies or in innovation in services, while for the remaining regions it will be more beneficial to invest in innovations in a specific sector or in several related sectors. The hardest task encompassed in the requirement of a smart specialisation is the specification by self-government authorities the social and economic identity of the region as well as identifying the most beneficial areas of specialisation. When choosing smart specialisation, a real potential, that will be realistically adjusted to the capabilities, possibilities and needs in the region, should constitute the basis for the process of selection. Regional innovation strategies are the tool for building the regional innovation system. They are the tool specializing the policy of a regional self-government towards the sector of enterprises. Regional innovation systems constitute a regional environment developed in a way which is favourable for creating,

transferring and using knowledge which serves the social and economic development. A characteristic feature of regional innovation systems is that they are rooted in the regional environment [4].

Regional innovation and smart specialisation strategies (RIS3) are created in regions next to region development strategies, or they are included in revised voivodeship development strategies. The main target of RIS3 should include undertaken actions in identified areas of science, economy which are the growth potential of the regions, for increasing the level of competitiveness and innovation of the voivodeship economy with the consideration of the rule of sustainable development.

The regional strategies of research and innovation for smart specialisation (RIS3) are integrated defined programmes of economic transformation of individual regions which are based on:

- using the strengths and competitive advantages of a given region and its potential in order to achieve perfection when considering differences in innovation possibilities of regions,
- full commitment of stakeholders and joint identification of the most suitable areas of specialisation and on the indication of the factors that hinder implementing innovations in the region,
- concentrating the public support in the scope of carrying out the policy and investments on key regional priorities, challenges and needs in the scope of knowledge-based development,
- using the tools supporting innovation and stimulating the possibilities of the development of investment in research and development by private entities favouring technological and practical innovations, creating the effect of synergy,
- the system of monitoring and assessment based on objective data, evidence and indicators.

Most often, East Poland voivodeships indicated specialisations based on the fields connected with the natural resources: bio-economy, food, agricultural and food processing, health. Names of specialisations refer directly to key sectors (tourism, health, industry) or are formulated in a general way, e.g. by describing the mutual connections between sectors in the form of a supply chain (Tab. 1)

**Table 1.** Identified smart specialisations specified in the Strategy of Social and Economic Development of East Poland (as at the end of 2017).

Voivodeship	Example
Warmińsko – mazurskie	Water economy – production of yachts, boats, water transport, water sports, biological regeneration, agricultural and food industry, machine industry. Timber and furniture making, high quality food.
Podlaskie	Dairy industry, agricultural and food processing, construction and timber industry, tourism, metal and machine industry, boatbuilding, medical sector, health sciences, eco-innovations, environmental sciences.

Lubelskie t	Green power engineering, bio-economy, medicine and health, IT and automation.
Świętokrzyskie	Resource-efficient construction, metal and casting industry, health and pro-health tourism, modern agriculture and food processing, IT and communication technologies, sustainable energy development, fair and congress industry.
Podkarpackie	Aviation and astronautics, quality of life, IT and telecommunications.

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Areas of specialisation in the mentioned regions of Poland were identified as a result of merging two approaches:

- bottom-up, i.e. various consultations with the representatives of companies, organisations of employers, the biggest companies in the region, as well as scientists,
- top-down, i.e. proposals of experts who at the request of voivodeship boards prepared the analyses of potentials of the regions.

The analysis of selected areas of smart specialisations in East Poland voivodeships indicated that it was visible that the horizontal connections, i.e. clusters were used when designing and implementing RIS3. Their creation allowed for identifying regional competitiveness and resources (indicate a sector, location or spatial division) as well as specify the priorities. That is why, in the 2014 – 2020 perspective clusters may be supported in mutual targets with the areas of smart specialisation. It is also recommended to strengthen the local and international cooperation, in particular in relation to the support of the developing sectors. In the East Poland regions the peculiar character of smart specialisations concentrating on agriculture and agricultural and food processing sectors is more visible. Common areas within determined specialisations are visible. The connections pertain in particular to the following industries and sectors encompassed by specialisations:

- food and agricultural and food products,
- ecology,
- tourism, medicine, health,
- power generation,
- IT and communication technologies,
- green construction,
- production of machinery and equipment.

Most common areas can be noticed in industries and sectors which are based on the natural resources of East Poland (ecology, food production and processing) and on the existing leading industrial sectors. The area of technology and research is common because in each region it supports endogenous economic sectors making them "smart". "Food and agricultural and food products" is a common area indicated in RIS3 by East Poland voivodesips. That area encompasses sectors connected with agricultural (vegetable and animal) production, agricultural and food processing (food industry), storing and logistics and the sale of agricultural and food products and food. It also

includes the production of machinery and equipment for agriculture and the food industry. Ecology is another common area within the determined specialisations. That area includes sectors directly connected with environmental protection (e.g. wildlife conservation, monitoring of the environment) as well as environmental engineering and environmental technologies (e.g. channelling and purifying wastewater, waste management, reclamation, regeneration). That area is complemented by the environmental research sector, R&D and eco-innovations. The last diagnosed common area within smart specialisations is tourism, medicine and health. That area also includes the tourist industry, medical research and technologies (e.g. biotechnology, genetics) and producing medicinal products, as well as medical services and treatments e.g. specialist treatments, rehabilitation, physiotherapy) and sectors connected with health prevention (e.g. dietetics, health lifestyle, wellness, health resorts).

Due to the occurrence of common diagnosed areas that constitute smart specialisations, joint initiatives should be undertaken in the scope of possibilities of executing projects that are interconnected in that macro-region. Moreover, activities for working out common above-regional smart specialisations should be undertaken. In the process of selection of smart specialisations in those regions their endogenous resources were considered. When selecting the areas of specialisation, self-government authorities were frequently keen on preserving the regional status quo than the redevelopment of the economy of the region through innovations.

### **3 Europe 2020 Strategy in relation to the Concept of Smart Specialisations of Regions Growth**

Determining smart specialisations is one of the targets of the Strategy for smart, sustainable and inclusive growth – Europe 2020. The interdependence of smart specialisation occurs in particular in connection with the priority pertaining to smart growth. Within the Europe 2020 strategy, the problem of regional specialisations refers to the central project of Innovation Union which assumes the support of innovation growth, including the improvement of the conditions for conducting research activities leading to the conversion of novel ideas into innovative products and services launched on the European Single Market. The Innovation Union emphasizes the necessity of:

- facilitating and coordinating national and regional research and innovation systems,
- departing from the practices of copying or doubling the undertaken actions and supporting the development of only those technologies that are most popular at a given moment,
- engaging all entities in the process of creating and implementing innovations, both states and regions – leaders of innovation, as well as those marked by the lowest level of innovation in such a way that each of them focused on own potential and path of growth,
- combining smart specialisation with the instruments of cohesion policy and rural development policy in the financial perspective,

- determine innovations and smart specialisations among the targets of structural funds programmes of the above-mentioned policies.

Also, one of the central initiatives of the Europe 2020 strategy – Digital Agenda for Europe – is connected with that topic. Its aim is to achieve permanent social and economic advantages thanks to a broad use of ICT technologies. Notable effects of the fulfilment of the Agenda should pertain to whole member states, regions and rural areas [18].

In a regional dimension, Europe 2020 is implemented via smart specialisations. Therefore, the task of the regions was to prepare a general strategy of growth with the particular consideration of smart specialisations. According to the EU guidelines, one of the priorities in the financial perspective for years 2014–2020 includes the Regional innovation strategies for smart specialisation, RIS3. The specifically developed RIS3 Guide was the help in preparing RIS3. The aim of preparing those strategies is to improve the effectiveness of financing R&D with the obligatory consideration of the regional potential. Efficient and effective system of support of research, growth and innovations constitutes the basic aim of the fulfilment of the Europe 2020 programme. The European policy stresses the necessity to accelerate and strengthen the building of knowledge based economy, the strive for the effective use of resources, and the increase of innovative capacities of regions. In the process of building innovative capacities of regions, self-government authorities mainly play a supportive function and coordinate pro-innovation behaviours and actions undertaken in the region.

#### **4 Factors Conditioning the Process of Implementing the Strategies of Innovation and Smart Specialisations in regions**

Implementing the regional innovation and smart specialisation strategies in individual regions is connected with the necessity to look for new in terms of quality and methodology ways in local and regional growth. The key driving force behind the growth of the regions is their own intellectual potential, with the particular consideration of the cultural identity of the place and historical experiences, as well as the knowledge, skills and aspirations of the local and regional communities. Moreover, innovation is necessary as well as creating the so called entrepreneurial climate constituting the main argument in making the decision about the location of significant investments in the area of the region [5].

Innovation strategies constitute the foundation of general growth strategies of regions that include all aspects of permanent and sustainable development. In individual voivodeships these issues were included in the growth strategies of those voivodeships the aim of which is to increase the national and international competitiveness of the economy of the region through the increase of its innovation, hence effectiveness which will create the conditions for balancing the labour market and the increase of income and the level of life of the people. Key factors conditioning the competitiveness of the regional economy include: high innovation of companies as well as effective and



efficient use of knowledge and scientific research by the industry sector. In order to implement the main premises of the innovation strategy in individual regions, in particular the development of innovation, the support from structural funds is necessary as well as implementing the economic and legal instruments into practice that decrease costs and risk of innovative undertakings.

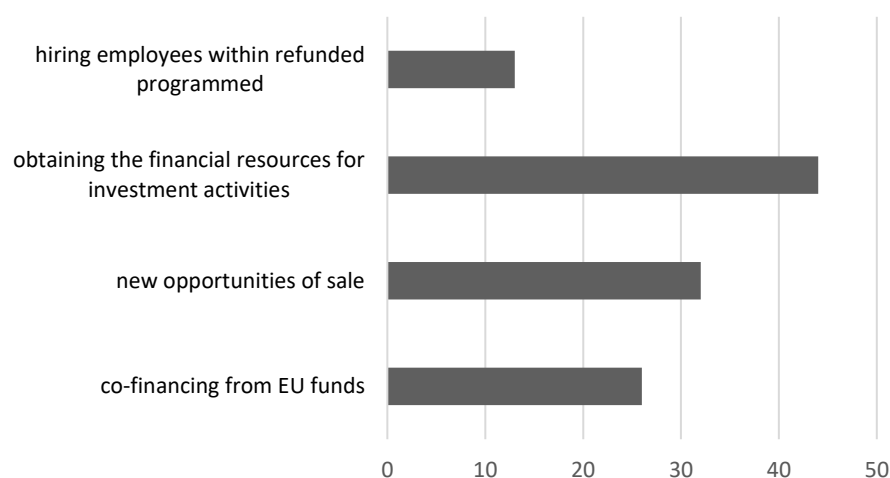
One of the most important challenges of the European Union was to determine a strategic and integrated approach to innovation in which all instruments of mid- and long-term policy, tools and financial resources were focused on supporting innovation. Such a model, also termed Innovation Union, also assumes that regional, national and EU policies should be closely interconnected and should be mutually complementary. Moreover, regular monitoring of the progress of the fulfilled strategic programmes should also be ensured.

The most significant target of the Regional Innovation Systems is the social and economic growth of a region through the creation of knowledge-based economy in an information society. An important aspect for the fulfilment of that target is building the regional consensus for increasing initiative, cooperation and openness in the region. However, no authorities are specified to which these actions would pertain. It might be any authority in the region the actions of which will contribute to the social and economic growth in that particular region. They should be a part of the system based on a field or fields constituting the specialty of the region. Thus, the most important target of the regional innovation strategies is not the implementation of new, considered state-of-the-art sectors of economy, but developing and adjusting to the new conditions of world competition of the sectors already existing in the region. In the same way, RIS3 might become the restructuring tool in the traditionally industrial regions. It might be concluded from the documents created by authorities that deal with the fulfilment and coordination of RIS3 programmes that the most important instruments of building the regional innovation systems, i.e. the instruments of intra-regional policy favouring the development of pro-innovation, include:

- identification of sectors and bodies in the region which might become the pillars of the system,
- increase of institutionalised and non-institutionalised cooperation between: companies, business-related entities and self-government administration, companies and business-related entities, companies and bodies creating or transferring knowledge, companies (large, small and medium-sized),
- creation of instruments opening the regional system.

These actions should be reflected in the process of creating the regional innovation strategies. Business-related entities, knowledge transfer entities should identify the needs of companies in the region in the process of creating the innovation strategy and should adjust their offer to those needs. It will allow not only for effective functioning of the innovation system in the region but will also ensure effective functioning on the market to those entities. The process of creating regional innovation strategies is to serve, among others, the realisation and fulfilment of that need at a regional level. Self-government administration of the regional level is the factor that initiates and coordinates the process of creation of strategies, so it has a significant impact on its

final shape. Because of that, it plays a very significant role both for the strategy and for own functioning in the region, in particular in the scope of the development of companies. The self-government sector may affect the process of implementing strategies in negative ways, especially in the case of the lack of cooperation with companies. The coordinating role of the regional self-government also comprises the actions connected with communicating the best experiences between European regions. Creating RIS3 may also stimulate the local self-government for the effective cooperation with the company sector and serve the creation of completely new bodies (most often connected with the transfer of knowledge or financing the process of creation and acquiring innovations). The most important role in the system is played by the companies, they are the subject of the described actions but at the same time their most important object. The key role in the regional innovation system is assigned to small and medium-sized companies as the environment for creating innovations. Large or the largest companies of the region played an important role in the regional innovation system. Their actions served mainly the development of small and medium-sized companies. Companies are the most important actors of the regional innovation system, but also its most important beneficiaries as the growth of companies delineates the growth of the remaining elements.

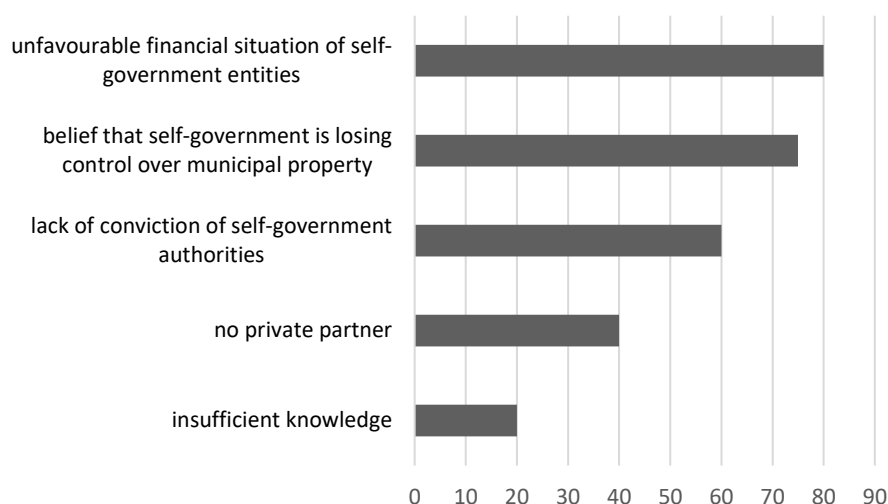


**Fig. 1.** The scope of cooperation of companies with self-governments, business-related entities in the process of implementing regional innovation systems (% of indications).

In the analysed East Poland regions, in the majority the cooperation of entrepreneurs with the institutional and self-government circle (Fig. 1) in the process of implementing RIS3 pertained to obtaining the financial resources for various investment undertakings (43% of indications), applying for EU structural funds (27% of indications), searching for new ways of sale (33% of indications) and hiring employees within refunded programmed (13% of indications). Business entities operating in individual regions used

the support from business-related bodies, i.e. regional development agencies, industrial parks, incubators of entrepreneurship.

Factors limiting the participation of authorities in the process of implementing regional smart innovation systems in the macro-region of East Poland were indicated mainly on the side of the self-government sector. The survey indicated that the factors that limit the cooperation of the self-government sector with the private sector in the vast majority included the unfavorable financial situation of self-government entities (80% of indications), insufficient knowledge (20% of indications), lack of conviction of self-government authorities to that kind of partnership (60% of indications), no private partner (40% of indications), as well as the belief that self-government is losing control over municipal property (80%). The results of research indicating the main barriers limiting the cooperation of the self-government sector with the private sector in the scope of the fulfilment of infrastructure projects in surveyed self-governments are presented in Fig. 2.



**Fig. 2.** The factors limiting the cooperation of the self-government sector with the private sector in the process of implementing the regional innovation systems (% of indications).

Summing up, it needs to be emphasized that the barriers that hinder building innovative capabilities of regions include the ineffective innovation policy carried out at the national level. The deficiency of financial resources for pro-innovation activities remains a significant problem. Other barriers that hinder building innovative capabilities of regions are connected with the lack of knowledge, experience, pro-innovation awareness of public entities that are responsible for the pro-innovation policy. Also, the barriers that hinder building innovative capabilities of regions include the incoherent and fragmented process of creating the innovation policy in the region for the creation of which the regional self-government authorities are responsible. It is the basic task assigned for fulfilment to the regional self-government. It needs to be remarked that the innovation policy carried out in regions most often consists in

implementing uncoordinated, individual projects, creating isolated often ineffective pro-innovation undertakings rather than building a permanent and consistent innovation system.

## Recapitulation

In East Poland voivodeships as poorly developed regions the outlined areas of smart specialisations pertained mainly to building the competitive advantage based on traditional sectors lacking in innovation. In the remaining highly developed regions, smart specialisations were more frequently based on innovative sectors and on increasing competitiveness through the increase of innovation. Therefore, it might be feared that the concept of smart specialisations will not contribute to the convergence of regions as the most significant aim of the EU Cohesion Policy. The regional strategies of smart specialisations are an instrument of building the regional consensus for the development of entrepreneurship. They are to create the environment in which innovations will appear in the region and convert them into a system that obtains, produces and uses innovations effectively. Their task is also to find specific sectors of regional economy that are important and give potential opportunities for development. They are a significant tool of restructuring the regions. The task of authorities acting for implementing the regional innovation systems is to cooperate with companies and business-related bodies with the aim of providing help to entrepreneurs with absorbing EU funds. The effects of implementation of the regional innovation systems largely depend on institutional effectiveness of the self-government administration involved in that process.

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## Selected Ecological Factors and Social Responsibility of Agribusiness Enterprises from Pomorskie Province

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**Abstract.** The aim of the article is to present the issues of social responsibility of agribusiness enterprises in the Pomorskie region in terms of their ecological responsibility, indication of selected pro-ecological factors and determination of the relationship between them and the competitiveness of the surveyed companies. The T-Chuprov convergence coefficient was used to test the significance and strength of the correlation compound. Its significance was examined on the basis of the  $\chi^2$  test.

Economic activity, which is a source of many threats to the environment and human health, should be carried out in such a way that it uses and shapes the natural environment in a sustainable way, while sustaining the durability of natural resources. Economic entities have to pay more and more attention to the impact of their production processes on the environment and human health.

It should be noted that more and more enterprises take responsibility for the effects of their actions on the natural environment and significantly contribute to its improvement. Thanks to this, they achieve measurable benefits. Research on the ecological aspect of CSR showed that the correlation relationship between the selected pro-ecological factors and the competitiveness of the surveyed companies is significant and the strength of the relationship is weak. Many factors contribute to the competitive advantage of Pomorskie's enterprises on the market, including those that relate to the environmental aspect of CSR.

The concept of corporate social responsibility consistently implemented by enterprises can contribute to improving competitiveness and building a lasting advantage over competitors.

**Keywords:** Ecological Factors, Corporate Social Responsibility, Competitiveness of Enterprises.

### 1 Introduction

In a dynamically developing market economy, there is a growing interest in the issues of corporate social responsibility (CSR), consisting of a conscious activity oriented not only on economic aspects, but also on broadly understood social and environmental interests.

On the European soil, CSR (its definition contained in the Green Book) is defined as voluntary inclusion of social and ecological aspects by the company while

conducting trade activities and contacts with stakeholders. Social responsibility is an element of building a long-term development strategy of the company [14].

Nowadays attention is paid to the need for responsibility for all the company decisions and undertakings that affect not only owners, managers, employees and shareholders, but also customers and other entities that the company influences.

Until recently, many companies carried out their activities in accordance with the theory of M. Friedman, according to which the basic goal of the company's activity is profit. However, the increase in social expectations has changed the current model of business thinking. More and more enterprises have begun to perceive and implement social and ecological activities, treating the environment as a kind of stakeholder in implementing the concept of corporate social responsibility [10], mainly because the economic sector is most frequently accused of environmental degradation, economic scandals and activities targeted only to maximize income without being responsible for the consequences of their actions [9].

The subject scope of corporate social responsibility includes, among others: the compliance with legal norms, philanthropy and the development of the local community, environmental protection, sustainable development, animal rights, human rights, employee rights, market relations, corruption and corporate governance [2].

The aim of the article is to present the issues of corporate social responsibility in terms of their ecological responsibility, to indicate selected pro-ecological factors and to determine the relationship between them and the competitiveness of the surveyed companies.

## **2 Ecology in the Concept of CSR – a Theoretical Aspect**

The increasing human interference in the natural environment and the subjugation of nature on a global scale result in negative consequences and the increasing ecological crisis, which means the inability to maintain human activity within limits safe for man and nature. This mainly applies to the activities of enterprises. The response of economic circles to the needs of the modern gave rise to the concept of Corporate Social Responsibility (CSR) in the 1990s [6]. An important feature of this concept is its interdisciplinary nature which shows the need for integration and knowledge in various fields of science and business practice [13].

Corporate social responsibility is not clearly defined, either in the subject literature or in practical activity. There are different interpretations of CSR in various fields of interest, and a clear evolution of the interpretation of this concept is noticed. It is worth noting the definition of this issue from the point of view of the motives of business entities implementing this idea [4, 10]. In the opinion of the entities, compliance with the rules can be understood as voluntary, *pro publico bono* activity or as a legal obligation resulting, for example, from environmental protection regulations or a comparison of profit and loss in the light of their own activities [14, 15].

Corporate social responsibility in business entities includes the following areas [14]:

- Market environment (suppliers, recipients, partners, competitors) – here, the expression of CSR is the application of ethics in dealing with the environment, the

use of honest information and advertising, the implementation of appropriate rules in the privatization processes, mergers and take-overs.

- Public environment (public administration, public benefit institutions, social organizations, residents) – CSR is a project carried out by economic entities for science, education, culture, health care, sport, in the forms of patronage, sponsorship, private and public partnership and other types of cooperation between enterprises and the public, including employee volunteering.
- The sphere of employment: human resources management (recruitment, selection, motivation system, remuneration), resolving employee conflicts, especially in the supervisor-subordinate relationship – CSR means adherence to the principle of subjectivity of employees in the human resources management in an enterprise, social justice, opportunities for personal development, guarantee of a sense of stability and security.
- Environmental protection (technology and organization of all enterprise activities related to the use of environmental resources); CSR is the proper management of natural resources in the enterprise, proper evaluation of resource use, compliance with environmental protection regulations.
- Investor relations (with existing or potential shareholders); CSR means reliability and full information for investors, respect for pre-emption rights, and compliance with promises made.

Compliance with the principles of responsible business first became popular where consumers began to demand high-quality goods, i.e. goods that are manufactured with regard for the natural environment, while respecting workers' rights and maintaining ethical standards. Thus, conduct in line with CSR principles, may be a source of competitive advantage in the markets.

The International Organization for Standardization has developed the ISO 26000 standard in the field of corporate social responsibility (in Poland PN-ISO 26000). Corporate social responsibility was defined as: the responsibility of the organization for the effects of decisions and actions taken towards the public and the environment. This responsibility is implemented through transparent and ethical behaviours that:

- contribute to sustainable development, health and social well-being,
- comply with applicable laws and international standards of behavior;
- take into account the expectations of stakeholders;
- are integrated throughout the organization and practiced in its internal and external relations [5].

As part of the implementation of the CSR concept, ecological responsibility primarily refers to the reduction of negative environmental effects, in particular to manufacturing products from environmentally friendly materials, savings in energy, water and materials in the production process, using recycling of raw materials and products, introduction of environmental assessments or reports on environmental activities [9]. The basic task of enterprises in taking care of the environment is to reduce resource consumption and pollution emissions, to recycle, and to develop environmentally friendly technologies [13].



A significant interest in ecological responsibility results from several premises [1]:

- the environmental aspect is a factor in the development of the enterprise,
- the problem of environmental protection has a global dimension,
- the environmental aspect may be a key factor for market success,
- the ecological factor plays a role in the processes of internationalization of enterprises,
- the ecological factor influences the implementation of local strategies by the company,
- the ecological factor may have an impact on the diversification phenomena of corporations, including internal ones.

Ecological CSR activities are related to ecology:

- environmentally-friendly production method, which in terms of competition allows to reduce energy and material consumption, or reduce fees and environmental taxes,
- a distribution method that ensures the use of the same channels for the recovery and recycling of waste and post-consumer waste,
- the product itself, which is characterized by environmentally friendly features, such as mitigation of global warming, efficient use of natural resources and proper disposal of chemical substances [12].

Ecological activities in the field of CSR lead to an increase in the trust of stakeholders, and, as a result, to create the reputation of the company.

Corporate social responsibility refers to the following expectations of society towards an organization at a given time:

- economic - through the production and manufacture of goods, satisfying the needs of clients and services, unemployment countermeasures, creating an additional financial result;
- legal - the company pursues its economic goals in compliance with applicable law;
- ethical - the company identifies itself with existing and widely accepted norms and values that apply in a given environment.
- philanthropic - undertaking voluntary activities for the people employed in the company, as well as for the environment and society [3].

**Table 1.** Arguments for and against corporate social responsibility [7].

<b>Arguments in favour of social responsibility</b>	<b>Arguments against social responsibility</b>
1. Economic activity creates problems and therefore enterprises should participate in solving them.	1. The purpose of a business enterprise is to bring profits to its owners.
2. Employees of the enterprise also create social groups to which the company is responsible.	2. The enterprise has no non-economic obligations except for those stipulated by legislation.
3. The enterprise has the necessary resources to solve social problems.	3. There is a possibility of a conflict of interest.
4. Enterprises are partners in economy, just like the government and society, therefore they should strive to meet the socio-economic and ecological needs of their partners.	4. Involvement in social programs allows enterprises to influence the environment.
5. By accepting its social, economic and ecological obligations, it acts in its own and social interest.	5. Enterprises lack experience in managing social programs.
	6. All decisions unrelated to the market game cause a decrease in economic efficiency and loss of management time and energy, which reduces economic efficiency.
	7. It is dangerous for democracy, because it can lead to the politicization of the enterprise.

CSR is based on the statement that enterprises, in connection with their operations, do not bear solely legal and economic responsibility, but are also obliged to undertake such activities that will contribute to the protection of and increase in social standards [8].

Therefore, according to the CSR concept, economic entities are expected to voluntarily accept obligations surpassing the requirements of regulations and conventions that must be respected.

### **3 Methodology and Goal of the Paper**

The aim of the article is to present the issues of social responsibility of agribusiness enterprises in the Pomorskie region in terms of their ecological responsibility, indication of selected pro-ecological factors and determination of the relationship between them and the competitiveness of the surveyed companies.

The research was conducted in 2016 using the diagnostic survey method and a questionnaire technique, among 96 intentionally selected agribusiness companies from Pomorskie Province. The questionnaire was addressed to the owners or persons

responsible for environmental protection in the company, who agreed to participate in the survey. The T-Chuprov convergence coefficient was used to test the significance and strength of the correlation. Its significance was examined on the basis of the  $\chi^2$  test. The level of significance was assumed at the alpha level of 0.05.

In carrying out the research, it was assumed that the pro-ecological activities of CSR carried out by agribusiness companies have an impact on the increase of enterprises' competitiveness on the market.

#### **4 Ecological Aspect of CSR in Pomorskie's Agribusiness Enterprises – Research Results**

Most of the respondents were young people. 15 respondents were below 25 years old, which constitutes 15.6% of the surveyed respondents. 56.3% of respondents (54 people) were in the 26-45 age group, and another 25 people, or 26.0% were in the age group of 46-55. Relatively fewest respondents (only 6 people) were more than 55 years old, which is 6.3% of the respondents.

Among the respondents there were 3 people with middle school education. They were young business owners. The largest number of people – 46 had vocational education 34 respondents had high school education. Among the respondents there were also 13 people with college education.

It can be concluded that the persons participating in the study had extensive experience, as most of the respondents had continued their careers for over 10 years.

Due to the company's position on the market, they could choose one of four responses, i.e. leading, developing, stable and declining positions. Only 12.5% (12 companies) recognized their position on the market as leading, 44.8% (43 companies) as developing, and 39.6% (38 companies) as stable. The position of only three surveyed enterprises, according to the respondents, decreases yearly.

Managers and employees must competently understand the idea of corporate social responsibility, because only then can the enterprise be socially responsible.

**Table 2.** Knowledge about CSR in the respondents.

Specification	Number	% of the total
Yes	79	82.3
Difficult to say	12	12.5
No	5	5.2

When asked about their knowledge in the field of corporate social responsibility, 82.3% of respondents answered that they had such knowledge, while 54.2% even considered it to be large. The knowledge of CSR principles may result from the fact that the answers were given by the owners, managers or persons dealing with environmental problems in small and medium-sized agribusiness companies, who ought to have such knowledge due to their positions. Only 5.2% of respondents admitted to a lack of

knowledge about CSR, and 8.1% did not express their opinions on this issue (see Tab. 2).

More and more owners and managers of agribusiness companies perceive the activity of their company in the perspective of the impact on the natural environment and the company's surroundings. Out of the 96 companies surveyed, more than half (53.1%) considered their business activity with regard to the principles of ecology as the priority in the area of CSR. The respondents admitted that ecological problems will not solve themselves, and the damages caused to the environment are punished by financial institutions with high fines.

**Table 3.** Ecological aspects of CSR in the development of agribusiness enterprises recognized by the respondents as the most significant.

Specification	Number	% of the total
Protecting and restoring the original environment	39	40.6
The use of sustainable development principles in production, processes and services	51	53.1
Development and implementation in the companies of the environmental management system	38	39.6
Economical management of natural resources, energy, etc.	57	59.4
Using environmentally friendly means of transport, i.e. reducing the emission of harmful gases	47	49.0
Monitoring of energy and consumption and pollutant emission	26	27.1
Having emergency action plans in the event of a breakdown or accident	13	13.5

The respondents considered economical management of natural resources, energy, etc. as the most significant ecological aspect of CSR (59.4%). Subsequently, the application of the principles of sustainable development in production, processes and services (53.1%) and protection and restoration of the original environment (40.6%), as well as the development and implementation of the environmental management system (39.6%) (see Tab. 3).

The next question concerned the need for changes in the company regarding the ecological aspects of CSR (see Tab. 4).

**Table 4.** The necessity to introduce changes regarding ecological aspects of CSR in the company in the opinion of the respondents.

Specification	Number	% of the total
Yes	66	68.8
Difficult to say	11	11.4
No	19	19.8

In the scope of ecological aspects of CSR, 68.8% of respondents acknowledged the need to make changes in the company. In turn, 19.8% of respondents did not notice such a necessity, and 11.4% of respondents did not comment on this issue (see Tab.4).

Social responsibility in contemporary business affects the changes taking place in enterprises. These changes bring many benefits (see Tab. 5).

**Table 5.** Benefits from the implementation of environmental aspects of CSR in enterprises in the opinion of respondents.

Specification	Number	% of the total
Achieving compliance with applicable legal regulations	26	27.1
Reducing the negative impact of the company on the environment by improving the control, modification or change of the process of introducing recycling of raw materials, media and the amount of waste generated	67	69.8
Reduction of fees for using the environment and environmental fines	61	63.5
Improvement in the company's image and cooperation with the surroundings	31	32.3
Reducing the company's operating costs by decreasing the consumption of raw materials	42	43.8
Reducing the risk of breakdowns and accidents (including environmental)	22	22.9
Reduction of the risk of civil and criminal liability	8	8.33
Facilitation of obtaining external financial resources	13	13.5

69.8% of the respondents considered reduction of the organization's environmental impact achieved as a result of: improvement of control, modification or change of the process, change and introduction of recycling of raw materials and the amount of waste generated, reduction of fees for using the environment and environmental fines for basic benefits concerning the implementation of ecological aspects of CSR in an agribusiness enterprise (see Tab. 5).

In summary, the analysis shows that:

- 79 enterprises have knowledge of corporate social responsibility,
- 57 enterprises conduct economical management of raw materials and energy,
- 38 enterprises have developed and implemented an environmental management system,
- 51 enterprises apply the principle of sustainable development in production, processes and services,
- 39 companies strive to protect and restore the original environment,
- 67 companies have reduced the negative impact on the environment by limiting the amount of waste,
- 47 agribusiness enterprises use means of transport that reduce emissions of harmful gases to the environment,

- 61 companies have reduced the fees for using the environment and environmental fines.

The research conducted has shown that the vast majority of enterprises operating in the Province of Pomorskie take responsibility for the effects of their activities on the natural environment and significantly contribute to its improvement.

## 5 Ecological Aspect of CSR and Competitiveness of Pomorskie's Agribusiness Enterprises – a Dependency Analysis

The aim of the analysis conducted was to answer the question: is there a relationship between selected environmental CSR factors and the competitiveness of enterprises from the Pomorskie region. The variable  $y_i$  was the degree of competitiveness of the surveyed enterprises on the market, taking into account their division into the so-called leaders, developing, stable and declining.

The variable  $x_i$ , where  $i = 1, \dots, 8$ , represented the selected ecological factors of CSR, i.e.:

- $x_1$  - having knowledge of CSR,
- $x_2$  - economical management of natural resources, energy, etc.,
- $x_3$  - development and implementation of an environmental management system in companies,
- $x_4$  - use of sustainable development principles in production, processes and services,
- $x_5$  - protection and restoration of the original environment,
- $x_6$  - reducing the negative impact on the environment by limiting the amount of waste,
- $x_7$  - use of means of transport reducing emissions of harmful gases,
- $x_8$  - reduction of fees for the use of the environment and environmental fines.

The T-Chuprov coefficient was used to test the significance and strength of the correlation. Its significance was examined on the basis of the  $\chi^2$  test. The level of significance was assumed at the alpha level of 0.05.

**Table 6.** Value of the  $\chi^2$  test and the T-Chuprov correlation coefficient for the  $x_i$  variables.

Variables	$\chi^2$ value	T-Chuprov correlation coefficient
$x_1$	3.3117	0.141
$x_2$	3.5994	0.147
$x_3$	4.1889	0.159
$x_4$	3.2857	0.141
$x_5$	3.9224	0.154
$x_6$	4.2244	0.160
$x_7$	1.4559	0.094
$x_8$	3.2119	0.139

Research on the ecological aspect of CSR showed that the correlation between the studied traits is significant and the strength of the relationship is weak.

All values of the T-Chuprov coefficient were at a similar level. Two features –  $x_3$  (the development and implementation of an environmental management system in companies) and  $x_6$  (the reduction of the negative impact on the environment by limiting the amount of waste) have reached the highest values of  $T = 0.159$  and  $T = 0.160$ , respectively. The feature  $x_7$  (the use of means of transport reducing emissions of harmful gases) had the lowest value of the T-Chuprov coefficient –  $T = 0.094$ . The remaining values of the T-Chuprov coefficient ranged from  $T = 0.139$  to  $T = 0.154$  (see Tab. 6). The research has shown that a number of factors influence the competitive advantage of enterprises on the market, including the researched variables pertaining to the environmental aspect of CSR.

## **6 Summary and Conclusions**

Changes occurring in the environment of modern enterprises influence the evolution of the main success factors on the market. In addition to the need to compete in the field of prices, technology and organization, it is necessary to present the company as a reliable, trustworthy and honest business partner. In connection with such expectations, the idea of corporate social responsibility was created [9]. Activities in the field of corporate social responsibility are increasingly taken up by agribusiness companies from the Pomorskie region. What is important is the way the company affects the environment or the local community; the investments in the environmental protection are also important, as well as respecting the law. Building a strong and stable position on the market is an important element of competitive advantage. From year to year, the concept of corporate social responsibility is gaining more and more supporters and its importance in the society continues to grow [13]. Corporate social responsibility is based on the enterprise-society-environment cooperation. This dependence means that enterprises strive not only to obtain material and social benefits through deepening the cooperation and a positive contribution to the society, while minimizing the negative consequences for this society and the environment.

The research conducted among 96 Pomorskie's enterprises showed that these companies are aware of the effects of their activities and take responsibility for them. Thanks to this, they achieve measurable benefits. These enterprises have knowledge in the field of corporate social responsibility, they conduct economical management of raw materials and energy, and some have developed and implemented an environmental management system; over 50% of the surveyed companies apply the principles of sustainable development in production, processes and services. Among the surveyed enterprises there were also those that strive to protect and restore the original state of the natural environment. Furthermore, as many as 67 Pomeranian companies have reduced the negative impact on the environment by reducing the amount of waste, and 47 by reducing the emission of harmful gases through the use of environmentally friendly means of transport.

The research on the ecological aspect of CSR showed that the correlation dependence between selected pro-ecological factors and the competitiveness of the surveyed companies is significant and the strength of the relationship is weak. It can therefore be concluded that the competitive advantage of Pomeranian enterprises on the market is influenced by many factors, including those that relate to the environmental aspect of CSR.

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## The Agrarian Structure of Horticultural Farms and Vegetable Production in the Czech Republic and in Poland

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**Abstract.** The aim of the study was to analyze and evaluate the agrarian structure of horticultural farms and the size of vegetable production in Poland and Czech Rep. These studies were preceded by a brief comparative analysis of the development of economies of both countries, including agriculture. Large fragmentation of Polish farms means that they cannot take advantage of economies of scale. Their effectiveness is low. It was noted that horticultural production in Poland is increasingly taking place in farms from 5 to 20 ha, also under cover. It is labor-intensive production, and there is a lot of work resources in agriculture in Poland. The agrarian structure of Czech agriculture is beneficial for large-area crops, the production of which can be mechanized. However, it is not conducive to the development of smaller horticultural farms. Vegetable production in this country does not cover domestic demand and many Czechs grow vegetables in home gardens.

**Keywords:** Horticulture, Vegetables, Farm Structure.

### 1 Introduction

Vegetables are annual, biennial or perennial plants. According to Welbaum [12], these are green plants or parts of plants. They can be eaten raw or after heat treatment. They can be eaten whole, but more often the usable parts are leaves, stems, tubers, roots or fruits. They can be a main dish or part of a main course. Salads and salads are prepared from them. They are not eaten for dessert. The vegetables must be handled skillfully in cultivation and after harvest to preserve their quality.

A healthy and varied diet should be rich in vegetables. They provide vitamins and minerals. The most valuable vitamins are C, A and E. Important minerals include sodium, potassium, calcium and magnesium. For human health, fiber and phytochemicals are also very important, especially antioxidant ones. They occur only in vegetables. It has been proven that people whose diet is rich in vegetables are less susceptible to cardiovascular diseases and some cancers [11, 6, 9].

Most valuable ingredients include fresh vegetables. The shorter the distance from the producer to the consumer, the less need for preservatives and refrigeration to maintain their good quality. Local vegetables are becoming more and more valued.

Domestic vegetable production should, above all, satisfy domestic demand. Production depends to a large extent on the agrarian structure of farms.

## 2 Data and Methods

The aim of the study was to analyze and evaluate the agrarian structure of horticultural farms and the size of vegetable production in Poland and Czech Republic. The studies used Eurostat and FAOSTAT data as well as statistical offices of the Czech (Czech Statistical Office) and Poland (Statistics Poland) for the years 2010-2017. The time range differed when analyzing the agrarian structure of agricultural holdings, including horticultural ones (the period 2010-2016 was adopted). The farm structure survey is a cyclic survey taking place every three years.

The study uses a descriptive analysis method, a method of analogy and comparisons, and a deductive reasoning method. Data are presented in tables and diagrams. Selected descriptive statistics were used, including structure and dynamics indicators. To assess the homogeneity of the distribution of land between farms, the concentration factor  $K$  was used, according to the formula [7]:

$$K = \frac{5000 - \sum_{i=1}^n a_i * b'_i}{5000} \quad (1)$$

gdzie:  $a_i$  – shares of units in area groups,  $b'_i$  – cumulative shares of a research variable in area groups.

## 3 Poland and Czech Republic – Resources and Development

The neighboring Poland and the Czech Republic are located in Central and Eastern Europe. There is a similar climate in them – moderate warm. In the Czech Rep. countryside is dominated by upland areas. In Poland, the majority of the area is occupied by lowlands. Poland covers an area of 312.7 thousand. km<sup>2</sup> and is almost 4 times bigger than the Czech Rep. Poland is inhabited by more people. In 2017, there were 38.4 million of them, ie 3.6 times more than in the Czech Rep. (Table 1). The Czech Rep., in turn, is more densely populated. There were 133 people per 1 km<sup>2</sup> (123 in Poland). The increase in the population is a pro-development stimulus of the Czech Rep. In 2010-2017 the number of inhabitants in this country increased by 73 thous. In the corresponding period in Poland, the population decreased by 0.2%. The growing population means an increase in demand for food, including vegetables.

In the Czech Rep. the standard of living is higher than in Poland. This is confirmed by the value of GDP per person. In 2017, it amounted to EUR 18,100 in the Czech Republic, compared to EUR 12,200 in Poland. In Poland, however, the rate of growth of this indicator was higher in 2010-2017. The value of GDP generated is influenced, among others, by the size and structure of employment in the national economy. In Rep.

Czech 50.5% of the total population is employed. The employment structure by economic sectors is as follows [3]:

- industrial sector – 36,8%,
- service sector – 59,9%,
- agricultural sector – 1,3%.

In Poland, 42.4% of the total population is employed, and the employment structure is slightly different [3]:

- industrial sector – 30,2%,
- service sector – 57,3%,
- agricultural sector – 12,5%.

**Table 1.** Selected data on the Polish and Czech economy. Based on [3].

Specification	2010	2017	2010=100
<b>Czech Republic</b>			
Total population (thous.)	10517	10590	100,7
Total employment (thous.)	5057	5346	105,7
Total unemployment rate (%)	7,4	2,9	-
Unemployment rate on rural areas (%)	7,7	3,0	-
GDP (mln euro, current prices)	156718	191643	122,3
GDP per capita (euro, current prices)	14900	18100	121,5
Gross value added total (mln euro, current prices)	141715	171981	121,4
Gross value added in agriculture, forestry and fishing (mln euro, current prices)	2381	3945	165,7
<b>Poland</b>			
Total population (thous.)	38517	38422	99,8
Total employment (thous.)	15370	16281	105,9
Total unemployment rate (%)	9,7	5,0	-
Unemployment rate on rural areas (%)	10,4	5,4	-
GDP (mln euro, current prices)	361804	467167	129,1
GDP per capita (euro, current prices)	9400	12200	129,8
Gross value added total (mln euro, current prices)	318291	410256	128,9
Gross value added in agriculture, forestry and fishing (mln euro, current prices)	9284	10740	115,7

The agricultural sector in Poland plays an important role in the economy, although it produces only 2.6% of gross value added. It is worth noting that every eight Poles work in the agricultural sector, and it still happens that there are no people willing to harvest fruit and vegetables. On the basis of the quoted data, Poland should be included in agricultural countries, the Czech Rep. – for industrial. The information published in the Competitive Industrial Performance Report 2014 shows that the Czech Republic occupies the 18th position among the most competitive industrialized economies in the world, Poland - 23 [10].

## 4 Farms in Poland and the Czech Republic

The functioning of agriculture and the profitability of agricultural production depend to a large extent on the agrarian structure [2]. In 2016, a periodic survey of the structure of farms was carried out in EU countries. On the basis of its results, it can be concluded that utilized agricultural area (UAA) has a similar share in the total area in the discussed countries. In the Czech Rep. they occupied 43.8%, in Poland - 46.1%.

In the Czech Rep. there were 22.8 thous. farms operating in the area of 3455,4 thous. ha UAA (Tab. 2). In comparison with 2010 decreased: the number of farms (by 3.7 thous., ie by 13.8%) and the area of land used by them (by 28.1 thous. ha, ie by 0.8%). These disproportionate changes in the number and area of farms caused that the average area of the farm in the Czech Rep. grew from 131.3 ha to 151.2 ha.

**Table 2.** Selected data on farms in the Czech Republic and in Poland [3].

Specification	2010	2016	2010=100
<b>Czech Republic</b>			
Number of farms (thous.)	26,5	22,8	86,2
Utilised agricultural area – UAA (thous. ha)	3483,5	3455,4	99,2
UAA belonging to natural persons (thous. ha)	1013,3	1039,7	102,6
Labour force directly employed (thous. AWU)	108,0	103,3	95,6
Standard output (mln euro)	3852,2	5081,9	131,9
Number of farms whose household consumes more than 50% of the final production (thous.)	4,1	2,2	53,4
<b>Poland</b>			
Number of farms (thous.)	1506,6	1410,7	93,6
Utilised agricultural area – UAA (thous. ha)	14447,3	14405,7	99,7
UAA belonging to natural persons (thous. ha)	12900,0	13183,0	102,2
Labour force directly employed (thous. AWU)	1897,2	1649,4	86,9
Standard output (mln euro)	18987,1	25005,6	131,7
Number of farms whose household consumes more than 50% of the final production (thous.)	510,8	259,0	50,7

In Poland, the agrarian structure is definitely less favorable. There is a huge fragmentation of farms. In 2016, there were 1410.7 thous. of them (by 95.9 thous. less than 6 years earlier). They occupied an area of 1,4405.7 thous. ha. In the years 2010-2016, the area of UAA decreased by 41.6 thous. ha, i.e. by 0.3%. The average area of the farm increased from 9.6 ha to 10.2 ha during this time.

Differences in the size of farms in both countries result from the agricultural systems prevailing there. In Poland, 91.5% of UAA is owned by private persons, while in the Czech Rep. – 30.1%. The remaining part of agricultural land belongs to legal persons (mostly commercial law companies, created in place of socialist agricultural cooperatives). Moreover, there is a large discrepancy in the Czech Republic between

the ownership of agricultural land and its use. Large agricultural entities use land leased from many owners. [1]

The total output standard of Czech farms in 2016 amounted to 5081,9 million euros. The number of people employed in them reached 103.3 thousand. AWU. Of the total number of farms, 15,5% consume over 50% of the final production in their own household. Polish farms worked out in total 2,500.6 million euros with employment at the level of 1649.9 thous. AWU. Farms producing mainly for their own needs accounted for 18.4%. Thus, the value of Polish agricultural production was nearly 5 times higher than in the Czech Republic, and employment was 16 times higher.

It is not difficult to notice that unit productivity of agricultural production in the Czech Republic is much higher than in Poland. In Czech Rep. in 2016 there was an average of EUR 222.9 thous. of standard output on one farm. Calculated per 1 ha, it was EUR 4,887.7. The Polish agricultural holding was able to produce an average of EUR 17.7 thous. per year. For 1 ha there was EUR 1,735.8 of standard output.

## **5 The Agrarian Structure of Horticultural Farms**

Vegetables are grown in horticultural farms and home gardens. According to the data of the national statistical offices of Poland and the Czech Republic, the area of backyard garden amounted in 2017 respectively 7.6 thous. ha i 4.0 thous. ha. In Poland, they accounted for 4.4% of the total vegetable crop area, in the Czech Rep. – 28,2% [5, 8].

The article assumes that production taking place in horticultural farms is of key importance for the economy. The rest of the article will be devoted to such farms.

The Eurostat methodology distinguishes three groups of horticultural farms:

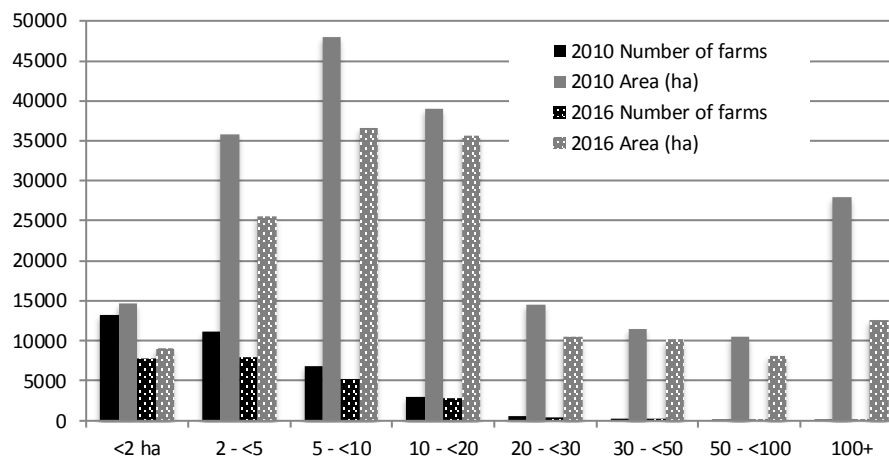
- specialist horticulture indoor,
- specialist horticulture outdoor,
- other horticulture.

### **5.1 Horticultural Farms in Poland**

In Poland in 2016 there were a total of 24.6 thous. horticultural holdings, of which 38.3% were farms specialized in crop production under cover. In comparison to 2010, the total number of farms decreased by 30.3%. In turn, the number of farms specializing in production under cover was lower by 13.8% [3]. The structure of the number and area of total horticultural holdings is presented in Fig. 1.

In 2010, horticultural farms occupied a total of 201.8 thous. ha. The vast majority, 88.3% of the number of all these farms, constituted units up to 10 ha. Such farms used 48.8% of the area occupied by all horticultural farms.

The largest group were farms with the smallest area (up to 2 ha). In 2010, there were 13.2 thous. of them in Poland. It is 37.5% of all gardening farms. The area occupied by them totaled 14,7 thous. ha, ie 7.3% of the total area of horticultural farms. The average area of a farm in this area group was only 1.1 ha.



**Fig. 1.** The agrarian structure of all horticultural farms in Poland in 2010 and 2016 with division into area groups [3].

The largest share in the total area of horticultural farms (23.8%) had in 2010 units from the area group of 5 - <10 ha. They occupied 47,9 thous. ha. There were 6.8 thous. of them, ie 19.3% of all horticultural farms.

In 2016, the total area of horticultural farms decreased in comparison with 2010 by 53.4 thousand. ha, i.e. by 26.5%. In each area group decreased: the number of farms and the area of crops. The largest dynamics of changes was recorded in the biggest farms, the area of which amounted to 100 ha and more. Their number decreased by 58.3%, and their area decreased by 54.9%. In 2016, there were 50 such farms operating on 12.6 thous. ha. The average area of a farm in this area group increased from 222.5 ha in 2010 to 251.6 ha in 2016. Their share in the total area of horticultural farms decreased in these years from 13.8% to 8.5%.

High dynamics of changes was also observed among the smallest horticultural farms (up to 2 ha). Their number decreased by 40.6%, and the area was lower by 38.2%. In 2016, there remained 7.9 thous. of the smallest gardening farms. They used a total of 9.1 thous. ha. Their share in the surface structure decreased in 2010-2016 to 6.1%.

The smallest dynamics of changes in the discussed period was characteristic for medium-sized farms (10 - <20 ha). Their number decreased by 5.8%, and the area was less by 8.3%. The most stable situation among this group of farms caused that their share in the total area of horticultural farms increased from 19.3% to 24.1%, and the share in the number of farms increased from 8.3% to 11.3%.

Farms up to 10 ha still accounted for the vast majority, but their share in the total number of horticultural farms decreased to 85.2%, and their share in the area of these farms decreased to 48.0%.

Farms from the range of 5 - <10 ha still occupied the largest area. It was 36.6 thous. ha, which accounted for 24.6% of the total area of horticultural holdings.

Concentration coefficient K for horticultural holdings decreased in 2010-2016 from 0.43 to 0.39. This means greater uniformity in the distribution of land between

horticultural farms and smaller polarization of farms towards the largest and smallest ones.

In 2016, there were 9,400 farms with crops under cover registered in Poland. The total area of their cultivation amounted to 42.2 thous. ha and decreased compared to 2010 by 9.7%. The quantitative and area structure of farms with crops under cover was similar to the total number of horticultural holdings. The largest share in the number of greenhouse holdings had entities up to 2 ha (37.1%). Their share in the area of these farms was 7.2%. In the six analyzed years, the number and area in this group of households decreased the most, respectively by 22.8% and 29.3%.

Both in 2010 and in 2016, the largest area was occupied by entities with the size of 5 - <10 ha. It was respectively 15.8 thous. ha and 14.7 thous. ha. Although the area of these farms decreased, their share in the total area of crops under cover increased from 33.9% to 34.8%.

The largest importance among specialist horticultural farms still have units up to 10 ha. It is worth noting, however, that in 2010-2016 their share in the total number of greenhouse farms decreased from 92.0% to 90.8%. Decreased also share in their area from 66.1% to 65.6%.

The study of the dynamics of changes in the number and area of greenhouse farms in units of 20 ha and more gave different results than the study of all horticultural farms. In all groups of larger greenhouse holdings there were increases in their number and area of UAA use by them. The area increased the most in the group of 20 - <30 ha (by 73.3%), and the number of such entities increased by 57.1%.

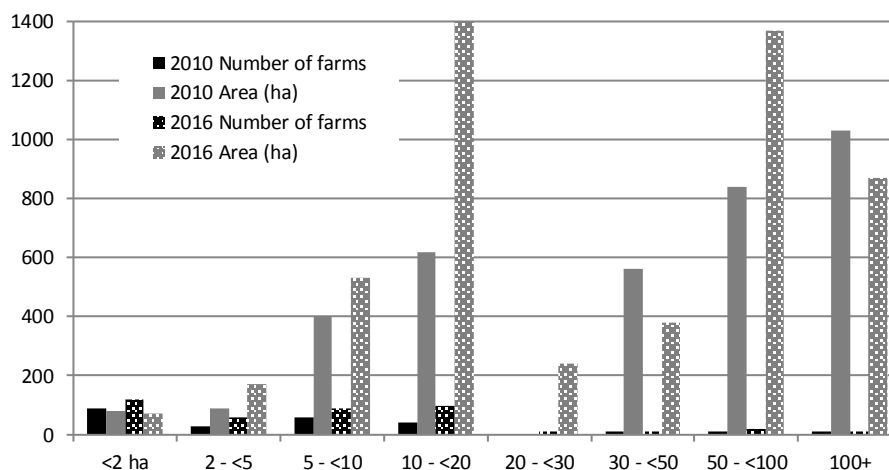
Among farms under cover, the concentration coefficient K. was calculated. In 2010-2016 its value decreased from 0.32 to 0.30. The results show a decreasing concentration of land in greenhouse farms. It is also seen that the stock of agricultural land is more evenly distributed between greenhouse farms than between all horticultural farms.

## **5.2 Horticultural Farms in the Czech Republic**

Number of specialist horticultural farms in the Czech Republic amounted to 420 in 2016 and increased by 68% compared to 2010. They occupied a total of 5030 ha, ie 39% more than 6 years earlier. The average area of such a farm in 2016 was 12.0 ha. Eurostat data shows that in the Czech Rep. has no specialist indoor horticulture.

In 2016, the largest number, because 120, were the smallest horticultural farms up to 2 ha (Fig. 2). In comparison to 2010, their number increased by 33.3%, but their area decreased by 12.5%. The largest area in 2016 was occupied by horticultural farms from the area group of 10 - <20 ha, and then 50 - <100 ha. It was respectively 1400 and 1370 ha. The highest dynamics of changes was observed in farms from the group of 10 - <20 ha. In 6 years, their number increased by 150%, and the area increased by 125.8%.





**Fig. 2.** The agrarian structure of all horticultural farms in the Czech Republic in 2010 and 2016 divided into area groups [3].

In 2010, 12.0% of all horticultural farms in Rep. Czech Republic owned 67.1% of the total agricultural land used by such farms. Over 6 years, unevenness in the distribution of land between different area groups of farms has decreased. This is evidenced by the index K. Its value decreased from 0.62 to 0.53.

## 6 Vegetable Production in the Czech Republic and in Poland

Horticultural farms mainly specialize in the cultivation of ground vegetables and under covers. Vegetables neither in Poland nor in the Czech Republic have a large share in the area of agricultural crops. In Poland, they occupy less than 2% of the sown area, in the Czech Republic 0.2%.

According to FAOSTAT data [4] in the years 2010-2013, the production of vegetables in Czech Rep. amounted on average 187.5 thous. tonnes per year. This amount covered national demand in 23.8%. In Poland, the situation was much better. Domestic production in the corresponding years amounted 5502 thousand. tonnes per year and satisfied domestic demand in 108.7%.

Area of agricultural vegetable crops in the Czech Republic in the years 2010-2011 amounted to on average of 9.1 thous. ha. In the years 2016-2017, this area increased by on average of 12.4%. In the same years, the average annual production of vegetables also increased from 248.6 thous. tonnes to 305.0 thous. tonnes, ie by 22.9% [5, 8].

The structure of vegetable harvest in the Czech Rep. were dominated by cabbages, onions and carrots (Fig. 3). Their combined share in the harvest of vegetables in the years 2016-2017 was on average 47%.

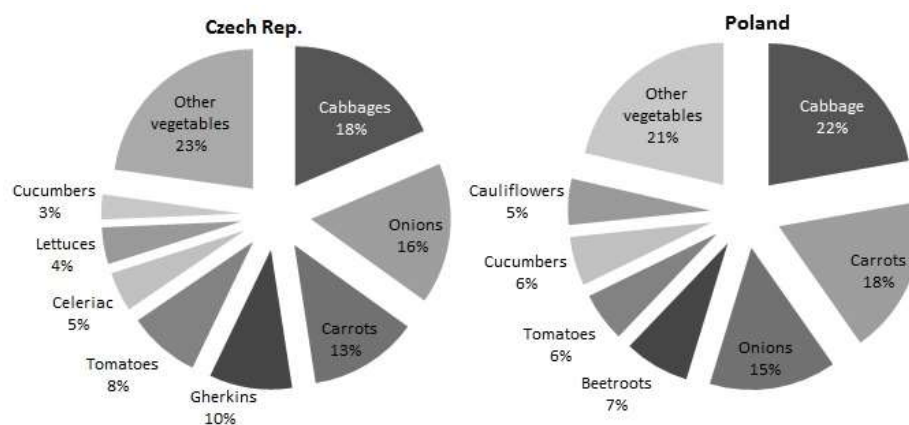


Fig. 3. The structure of vegetable harvest in the Czech Republic and Poland – average annual data from 2016-2017 [5, 8].

In Poland, the area of vegetable cultivation in 2010-2011 amounted to on average 168.8 thous. ha. In 2016-2017, it increased by an average of 5.5%. In analogous years, production increased by only 1.5% (from 4496.0 thous. tonnes to 4565.3 thous. tonnes). In the last analyzed period, the production of vegetables in Poland was nearly 15 times higher than in the Czech Rep.

The production structure is dominated by the same three vegetable species as in the Czech Rep.: cabbages, carrots and onions. Their combined share in the structure of harvest in the years 2016-2017 amounted to 55%.

## 7 Conclusion

Vegetables are a very important component of the diet especially in times of struggle against obesity and civilization diseases. Poland and the Czech Republic are characterized by similar climatic conditions but different terrain features. Poland has better natural conditions to conduct agricultural activities, but in the Czech Rep. agrarian structure is more favorable to achieving higher production results. It is based on large-area farms in which the unit production output is much higher than in very fragmented farms in Poland. The average area of a farm increases in both countries. In Poland, in the years 2010-2017, the average size of a horticultural farm also increased.

The future in the production of vegetables is specialist horticulture indoor. Such production is lacking in the Czech Rep. It is an activity that requires a lot of work and capital. There are many labor resources in agriculture in Poland and this may favor the development of vegetable farms. It was noted that in both countries the land concentration ratio in horticultural farms decreased. This means that there is a decrease in such farms among units from the smallest and largest area groups. It is to be expected that medium-sized farms (with an area of 5-20 ha) will dominate in the agrarian structure of horticultural farms.

Vegetable production in the Czech Republic does not cover domestic demand. Many Czechs run their own vegetable growing in home gardens. This is not conducive to the development of specialized horticultural farms in this country.

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## Innovations in Agritourism Farms in Poland

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**Abstract.** The aim of the article is to present the importance of innovations in agritourism farms in Poland as a social element of mutual relations and cooperation in local and regional development. The paper describes the concept of innovation in agritourism activity. The main idea of creating innovative solutions was presented. There were also presented examples of innovative farms, which prove the entrepreneurship of their owners. The article was prepared with the use of the desk research method. The classic analysis of documents was used. The selection of methods determined the availability of source materials, some of which were of primary or secondary character. In the article it was indicated that innovations prove the entrepreneurship of farmers, because they offer not only accommodation and food, but also innovative products on their farms. Observing the changes in the tourism market, including the agritourism market, it should be stated that service providers are interested in creating and introducing innovative solutions, and service users are open to new experiences.

**Keywords:** Innovation, Agritourism, Agritourism Farm.

### 1 Introduction

In the modern world, agritourism is becoming more and more fashionable in many countries as a form of active recreation in rural areas. The existing competition in this sector makes agritourism farms more and more often provide innovative and specialized services (tourist products). New challenges faced by farms make them start to compete with each other through location, room equipment, price or other attractions. An important condition which creates an interesting and unique offer for recreation in the countryside is the construction and implementation of diversified leisure activities, taking into account natural (natural), recreational, anthropogenic and specialist values of the nearest surroundings. Owners of agritourism farms more and more often, in order to meet the expectations of the market, implement innovative solutions, as the innovativeness in the scope of offered services and products proves the market advantage. Currently, innovativeness in agritourism is treated and understood as a possibility of creating and implementing changes in various spheres of social and economic life, because it enables generating an advantage on the market in the era of high competition [10,3].

Many authors [34, 35, 36, 17, 24, 29, 20, 22, 18, 27, 1, 15] indicate that there are many factors determining the development of agritourism in a given area. The basic factors include the environment and its elements, i.e. natural or landscape values of the region. Numerous studies carried out in this respect [6] indicate that nature and landscape are no longer basic and one of the elements of choosing a holiday destination in the countryside. Agritourists are increasingly interested in specific elements of the local offer. This may indicate that the introduction of innovative solutions is a chance to "attract" more tourists to rural areas. Agritourism in Poland is the most popular non-agricultural business in rural areas. The data showing the state of development of agritourism in Poland are of an estimated nature, as it results primarily from the possibility of conducting agritourism as an additional activity by a farmer (Article 3 of the Act on Freedom of Economic Activity) and heterogeneous interpretation of the provisions, including those concerning the obligation to register this activity. Unfortunately, there is also a lack of continuity of research in this area, and each institution has its own method of estimating this phenomenon [33]. The main source of information for many years have been the studies of the Institute of Tourism, which was based on public statistics and carries out its own research projects. According to the studies of the Institute of Tourism, in 2013 there were 7953 agritourism farms in Poland. According to the Central Statistical Office, in 2015 there were 8012 farms in Poland. Due to the newly emerging agritourism activity in rural areas, there is a lack of clear information on the number of agritourism farms due to the instability of decision-making by farmers in creating agritourism services.

In Poland, rural areas are characterized by exceptional natural wealth, beautiful landscapes and areas of high natural values, folklore and folk tradition, which are conducive to conducting additional activities. Regional diversity as well as natural attractiveness of the areas causes that the largest number of agritourism facilities is created in mountainous areas, lakes and river valleys. The agritourism activity carried out in Poland in most cases complements the basic agricultural activity. For over 40% of farms dealing with agritourism, profits from it constitute from 30 to almost 80% of the total income. Numerous studies and studies of the Institute Geographii and Spatial Planning of the Polish Academy of Sciences prove that agritourism services are best developed in 6 regions of Poland: małopolskie, podkarpackie, pomorskie, zachodniopomorskie, podlaskie i warmińsko-mazurskie.

The aim of the article is to present the importance of introducing innovations in agritourism in rural areas in Poland. Selected examples of innovative solutions in the scope of provided services and products were presented. It was assumed that the introduction of innovations contributes to the increase in the number of tourists enjoying leisure time in rural areas, which proves the entrepreneurship of the owners of these facilities.

## **2 Materials and Methods**

This article is based on the desk research method. The author used secondary data, carefully analyzing and selecting them in order to extract important concepts, to define

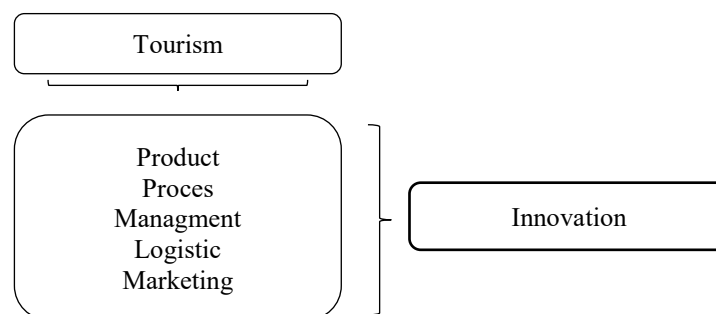
the research issues in relation to the issue of innovation of agritourism farms. The analysis of content, statistical data, cross-sectional analyses and comparisons of collected data were used. Such an approach made it possible to obtain a wide context of knowledge in the research project undertaken. The source materials were industry reports, results of scientific research in the area of innovation and the agritourism market.

### **3 Innovation in Agritourism - Test of the Characteristics of the Phenomenon**

An important direction of development of contemporary tourism in Poland is agritourism understood as conducting tourism activity on farms [5,35,36]. Agritourism has a long tradition in the European Union countries and is formally treated as a field of agriculture. It is mainly included in the group of social phenomena shaping the lifestyle and interests of the population [4,7]. Agritourism is addressed mainly to a wide range of tourists, e.g. individual tourists, families or small tourist groups [28,35]. It does not require an extensive accommodation or food base, as it can develop on the basis of the existing housing stock of the hosts [13]. The agricultural holding or other facilities and recreational space within the holding may be used for active leisure. The concept of 'agritourism' can be considered from the point of view of tourists or quaternursors. For tourists it is important to be active in tourism, where you can relax in the agricultural environment and learn about agricultural production. For the service provider it means various forms of hotel, gastronomy, leisure, recreation, sport, treatment and rehabilitation [7,28]. Foreign literature also shows that agritourism includes certain services provided by agri-food processing plants, companies trading in agricultural products [13,19]. It should be pointed out that agritourism is distinguished by several important features. Firstly, it should not be equated with rural tourism; secondly, there is a direct link between agritourism and a functioning agricultural holding, consisting in the use of its various resources in the processes of satisfying the needs of tourists; it is not limited to the accommodation of tourists, but offers them a package of attractions for active recreation. Trends observed in Poland indicate a growing interest in agritourism, where rural areas play an increasingly important role, and a well-prepared agritourism offer may be an important competition for mass tourism. The changes taking place on the tourist market cause that tourist entities constantly follow the activities of the competition and try to adapt their offer to the changing needs and expectations of customers. Growing income levels and the mobility of tourists make travel more frequent. The requirements in terms of services provided are also increasing. Currently, tourists are looking for offers that will not only meet their expectations, but at the same time will be innovative. Growing competition on the tourism market results in the owners of tourist entities taking up a wide range of services various activities in order to build competitive advantage. Innovative actions are important tools for building a competitive advantage. They have an important impact on the development of the entire tourism sector [9]. In many publications and reports in the field of tourism, it can be noted that it is often emphasized that currently there

are rarely discoveries in the aspect of innovation in tourism. This is due to the fact that innovation in this area is the result of many costly, long-term research carried out by professionals in this field. Nowadays, innovation is perceived as an entrepreneurial activity of the people or entities that implement it. There are many different approaches to innovation and innovation in the literature, which are constantly evolving. Despite the differences, the majority of those dealing with this issue recognize that effects are the most important in their implementation [27].

To date, reference has been made to the issue of innovativeness in relation to non-agricultural business entities [32]. Nowadays, the introduction of innovations in farms is a market requirement. At the same time, broadening and development of knowledge in the field of innovations in agriculture, the farm takes place with much weaker dynamics than in other sectors of the economy [15]. Problems with introducing innovations in the tourism sector are similar in many countries Zawadka [36] indicate, innovations are rare or absent. There are many reasons for the low level of innovation in tourism. To those that occur in other service industries one should also add some specific for tourism activities, e.g. related to the sphere of human resources: lack of opportunities for professional development, low level of human resources education, high employment fluctuation. Currently, rest in rural areas has become a common form of spending free time, popular among all social groups. Due to the prevalence of this phenomenon, the scope of agritourism activity in rural areas has been extended, as it has become a variable field, developing and using new technologies. It should be stated that in order to talk about innovations in the field of agritourism it is necessary to take a close look at the specific features of tourism which influence its character. Innovations in tourism may concern several elements (Fig. 1). The classic division of innovations in literature indicates that they can be divided into product, process, marketing and organisational innovations. Product innovations refer to the introduction of a new tangible or intangible product on the market or to a significant improvement of the product. Process (technological) innovations are related to the implementation of new or improved methods of production of tangible goods or provision of services, distribution. Marketing innovations concern the introduction of new, improved marketing solutions. They may concern such aspects as: product, brand, packaging, positioning, pricing policy or promotional activity. Organisational innovation means the application of a new concept of business organisation, management methods and work organisation [11].



**Fig 1:** Innovation of tourism.

In the case of innovations in agritourism, innovations in product, process, management, logistics and marketing can be distinguished. Innovation in tourism can be the creation of a new, unique product "from scratch". (e.g. thematic villages), as well as creating a professional marketing environment for the existing natural or cultural values (e.g. organising services around folk culture objects). An innovation may also be a product in the form of a place (e.g. Ślęża mountains). In order to create an innovative product in agritourism, it is necessary to use many resources. These are material resources related to e.g. culture, passion, profession, but also to owned facilities (farms). More and more people offering rest in the countryside create a branded product, e.g. wickerwork, pottery, herbalism, sculpture, culinary art. Innovations in agri-tourism determine the strength of a given farm and its entrepreneurship and ability to cooperate in many undertakings [14,15,16]. The process of creating innovations in tourism is based on a number of factors. The most important factors include: competence, creativity, ability to use one's potential, appropriate collection of information about the market. Apart from factors supporting the development of innovativeness in agritourism, there are also barriers hindering it. One of them may be lack of capital, reluctance to innovate or lack of knowledge in their scope. Another important aspect in which a number of innovations are implemented is the area related to logistics. Building a well-functioning logistics determines the competence of a given facility and proves the high quality of services provided. Also, the marketing activities and an appropriate policy in this respect contribute to the growth of competitiveness of the economy on the market. The simplest form of innovation in tourism, including agritourism, is to improve the quality of tourist services and offer new products. It consists in increasing the technical comfort of rooms or introducing variety of food. The quality of services offered on farms is important in terms of the tourist's decision to choose a given accommodation unit. Nowadays it can be noticed that a tourist is not enough to create a specific offer related to rest in rural areas, but is looking for new experiences, experiences, opportunities to experience something new. Shaping the offer of rest in rural areas is determined by presenting something new, unique based on local branding giving market advantage [13]. Innovation on the market of agritourism services has a heterogeneous and diverse character. This is mainly due to the expectations of customers in relation to the offered products. The most "pro-innovative" are business tourists who expect attractive and modern services. On the other hand, foreign tourists and weekend tourists are the least interested in innovators, as improving products may cause disruption in meeting the needs reported by them, causing lack of satisfaction with the products and services purchased [19]. An important aspect of innovation in agritourism activity it is undertaking cooperation with other entities. Building a network of products, culinary trails, educational farms, clusters allows for the exchange of knowledge, information and experiences. Pałka-Lebek, and Brambert [16] indicate that such cooperation may take place on the basis of the innovation model, referred to as the triple helix, i.e. the creation of knowledge and experience between the three spheres. The first sphere is enterprises (agritourism sector), the second is the research and development sphere (supporting institutions) and the sphere of public authorities. Thanks to this approach, it is possible to achieve a synergy effect, as it is based on interactions, connections and cooperation in the network [4, 2]. The introduction of innovations in agritourism farms is an unquestionably important factor influencing their development. In order to be competitive on the market, owners of tourist facilities take



the trouble of implementing innovations, which is to reflect their advantage on the market.

An important aspect of innovation in agritourism activity is cooperation with other entities. Building a network of products, culinary trails, educational farms, clusters allows for the exchange of knowledge, information and experience.

#### 4 Examples of Innovative Solutions in Rural Areas in Poland

The development of rural areas in Poland is undoubtedly influenced by agritourism. The multifunctional development of rural areas and the development of non-agricultural functions of rural areas is conducive to conducting agritourism activities. Farms engaged in this type of activity acquire new skills, which undoubtedly have a positive impact on the local tourism market. Owners of agritourism facilities often collide with trends on the tourism market. In order to meet these trends and expectations, the owners of these facilities should introduce innovations. In the development of agritourism, innovation is undoubtedly of fundamental and key importance for success, as competitiveness depends on them [9,3,26]. As the Tew and Barberi [30] emphasizes, the key importance then is the human and social capital held. Moreover, farms should constantly change and surprise tourists with new products and services. The agritourism farms in Poland are characterized by different operating conditions and these are natural, natural and socio-economic conditions. Many authors point out that innovation in agritourism does not come into being on its own. Certain conditions have to be met in order for it to exist. They are often a consequence of network connections between specific elements of the agritourism environment that make up the system. Sources of innovative systems in agritourism are universities, innovative companies, local governments, whose task is to create hard and soft competences [20,21,18,12]. Undoubtedly, the introduction of innovations in agritourism should be one of the basic assumptions of national and regional policy. It results mainly from the fact that in order to counteract numerous barriers limiting the introduction of innovations in agritourism, which include: insufficient farm budget (financial barriers), institutional and legal aspects, still too limited cooperation with organisations implementing innovations. In Poland, examples of innovative solutions in the field of agritourism can be distinguished by: tourist clusters, educational farms, villages, thematic clusters, offered agritourism packages and care farms (tab.1).

**Table 1.** Selected examples of innovative services in agritourism activities.

Product/service	Short characteristics
Tourist clusters	From the data contained in the studies in 2014, it results from the fact that 14 clusters operate in the area of tourism in Poland. Their idea is to build a regional agritourism product. Agritourism farms, which cooperate with each other, can provide the tourist with a package of appropriate products. In Poland, a very frequent example is offering customers food products, such as honey, fruit and vegetables.

Educational homesteads	<p>Studies and reports show that there are currently 245 educational homesteads in Poland. An educational homestead is a rural holding with farm animals or agricultural crops intended for presentation to groups of children and adolescents accepted as part of school programmes or made available as a tourist attraction for families with children and adults travelling individually and implementing educational programmes in at least two fields:</p> <ul style="list-style-type: none"> <li>-plant production,</li> <li>-animal production,</li> <li>-processing of agricultural products, awareness,</li> <li>-ecological and consumer education,</li> <li>-heritage of rural material culture, traditional professions, handicraft and folk creativity.</li> </ul> <p>The idea of educational homesteads in Poland is primarily to promote tradition and folk culture, getting to know Polish food and disseminating the idea of education on a farm.</p>
Agritourism packages - thematic	<p>Concentrated package consisting of several services or products, addressed to tourists interested in a particular topic. The selection of elements of the package is aimed at satisfying the basic needs of the tourist, and meeting his or her targeted expectations through the</p>

The presented examples of innovative services (products) in agritourism are an important element in the structure of the tourism market. Their development and dynamics depend on the quality of services provided and on the innovative approach to meeting the evolving needs of tourists, which is possible thanks to the introduction of changes and innovations in this area. Utilising an attractive idea and building an original theme undoubtedly influences also the integration of the local environment. The discovery of rural areas is a unique and important attraction, which will increase the interest in rural areas and influence the further development of the tourist function.

## 5 Conclusions

Innovations are an important element of competition on the tourist market. The idea of their implementation and application makes it possible to increase the ability to adapt the activity, services and product offer to changes in trends in the market environment and contributes to a better competitive position. The presented examples of tourist innovations confirm that the owners of tourist facilities, in order to be competitive, in a rational way try to present the advantages of existing assets in rural areas, which include: landscape, silence, peace, clean air, climate, rural architecture, art and folk culture, customs and customs. Many researchers emphasize that the introduction of innovations in agritourism activity is crucial as it proves the strength and advantage of a given farm on the local tourist market [28, 26,25,19,17,6,4,5,29]. In Poland, agritourism farms, despite many barriers, undertake the effort of introducing various types of innovations, whether in terms of products or services. Undoubtedly, many more actions are still needed in this aspect in order for the owners of these facilities to be

competitive on the tourist market. The presented innovative measures implemented by agritourism farms in Poland may stimulate the introduction of new products, services and solutions by other farms. The emerging new directions of provided solutions reflect the global trends in the directions of innovation in tourism services. Observing the changes taking place on the tourism market, including agritourism, it should be stated that service providers are interested in creating and introducing innovative solutions, and service users are open to new experiences.

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## **RDP 2007-2013 as an Instrument for Diversification the Rural Economy in Poland**

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**Abstract.** The article deals with the implementation of the Rural Development Programme 2007-2013 in Poland and is a part of research evaluating the use of available financial resources within the framework of EU policy. The aim of the paper was to present the Rural Development Programme 2007-2013 as an instrument supporting changes in the diversification of the economy in rural areas in Poland. The data of the Agency for Restructuring and Modernization of Agriculture provided by the Ministry of Agriculture and Rural Development as at 31 Dec 2015 were used. It was found that the diversification of the rural economy was the objective of two measures under axis 3 of the programme and under the Leader approach. In the analyzed period, PLN 1,517.7 million of public funds were spent on diversification towards non-agricultural activities, and PLN 2,785.5 million on creation and development of micro-enterprises. Regional differences in the allocation of public funds for diversification of the rural economy were found, much less in the case of measures supporting micro-enterprises. Support under the RDP allowed for the creation of 28,285 jobs, mainly in the field of services for agriculture and forestry (39% of the total), services for the population (21.7%) and construction and installation services (15.6%).

**Keywords:** Multifunctional Rural Development, Non-Agricultural Workplaces, RDP 2007-2013.

### **1 Introduction**

In the rural development policy in Poland, a multifunctional rural development model is implemented, the implementation of which in practice is subject to evolution from the moment of the systemic transformation at the beginning of the 1990s. The concepts of multifunctional rural development presented in literature emphasize the need to diversify rural space and economic activity by developing economic functions other than agricultural. Multifunctionality refers to the need to create new jobs in rural areas, which may result in the emergence of new sources of income for residents [1]. A part of the multifunctionality of the village is the multifunctionality of agriculture [15, 16], where farms offer a wide range of products and services, develop non-agricultural business and obtain additional income of a non-agricultural nature. Due to the declining

role of agriculture as the basic source of income in rural areas, the creation of the possibility of supplementing income from agricultural production with income from other activities becomes a priority. The implementation of the concept of multifunctional development of rural areas may contribute to increasing the attractiveness of rural areas as a place of work and residence [13].

The need to apply the concept of multifunctional development of rural areas results directly from the specificity of rural areas in Poland. The most common form of economic activity in rural areas is agriculture, which as a result of systemic transformation of the economy has become an economic activity with low-income. In the rural areas, changes in the income structure have been occurring for many years, consisting in an increase in the share of income from hired labor and from non-profit sources, and a decrease in the share of income from work in agriculture. Nevertheless, income from agricultural production is still important in the structure of income, which according to data for 2016 is the main source of income for 34.2% of rural households (decrease by 0.7 percentage points compared to 2013), while income from non-agricultural activity is indicated only in 15.2% of households [7]. An important source of income in the countryside is salaried labor and income from retirement and disability pensions, indicated respectively by 47.7% and 33% of households.

Among many problems of rural development, on the one hand, high unemployment and large manpower resources are mentioned, which results in migration of people in search of jobs. On the other hand, there is a poorly developed network of services for the population [11]. Supporting the creation of new jobs outside agriculture can bring effects desirable from the point of view of the development of the Polish countryside, such as increasing the income of the rural population, reducing unemployment, reducing depopulation of rural areas and improving rural residents' access to services provided at the local level.

A characteristic feature of socio-economic changes in recent years in Poland is the dynamic development of entrepreneurship in rural areas, which is illustrated, inter alia, by a slow increase in the number of agricultural holdings that run non-agricultural economic activities mainly in the field of services such as agritourism, trade, processing, construction, transport and storage. In 2016, 40.8 thousand agricultural farms conducted non-agricultural activities, which is an increase of 10.6% compared to 2013. In addition, the number of people who undertake non-agricultural activities on their own is increasing in rural areas, as evidenced by the increase in average income from self-employment outside agriculture in rural households; in 2007 this income was equal to PLN 46 per capita, and in 2016 PLN 87 per capita [6, 5]. Economic entities in rural areas, and especially micro-enterprises predominating there, encounter problems of various nature, such as market and financial barriers (high costs of external capital, high labor costs). Among the specific barriers resulting from the location of entities in rural areas should be mentioned poor access to infrastructure and to education and counseling, which results in low innovativeness of enterprises.

The instruments available under the Common Agricultural Policy of the European Union are of particular importance for the implementation of the multifunctional rural development model in Poland and its intensification [14], for which the diversification of the economy in rural areas is a priority. One of the significant financial instruments

supporting the diversification of the rural economy in Poland is the Rural Development Programme.

The aim of the paper was to present the Rural Development Programme 2007-2013 as an instrument supporting changes in the diversification of the economy in rural areas in Poland. To reach the purpose, the following tasks have been set: 1) to identify individual measures of the program, which support the diversification of the economy and determine the amount of support from public funds; 2) to show the regional differentiation of the allocation of public funds; 3) to indicate the effects of the implementation of the measures and types of activity supported.

## **2 Materials and Methods**

The subject of research is RDP 2007-2013 as a CAP instrument supporting changes in the diversification of the rural economy in Poland. The paper used the data from the Central Statistical Office [4] and detailed data of the Agency for Restructuring and Modernization of Agriculture concerning the implementation of projects under axis 3 and 4 of the Rural Development Programme 2007-2013 [11]. The data was made available for the purposes of the study by the Ministry of Agriculture and Rural Development as at 31 Dec 2015 [10]. In addition, the programme documents were analysed. The research period covers the years 2007-2015, which means the implementation time of projects co-financed from the RDP 2007-2013.

The amount of the funds spent means the total public payments made in absolute terms according to the provisions of agreements of all beneficiaries. In the comparative analysis of the allocation of funds in the regions, the indicator of expenditures per agricultural farm and per capita of rural areas was used according to the data for the Central Statistical Office of 2016 [4].

## **3 Results and Discussion**

The main objective of the RDP 2007-2013 was to implement the concept of multifunctionality of agriculture and rural areas. The programme consisted of four axes that concerned: improving the competitiveness of agriculture and rural areas (axis 1); improving the environment (axis 2); improving the quality of life (axis 3) and Leader approach (axis 4). On the basis of the analysis of the document, it was stated that the diversification of the rural economy was the target of two measures in axis 3 and their counterparts under the Leader approach. One could distinguish two basic directions of spending. The first concerned the diversification into non-agricultural activities. As part of the implemented projects, assistance was provided for the farmers, their spouses and household members to undertake or develop in the field of production or services, which was to influence the creation of non-agricultural sources of income, promote non-agricultural employment in rural areas and contribute to the creation of conditions for sustainable socio-economic development of rural areas. As part of the second direction of spending funds, the creation and development of micro-enterprises was fostered in order to diversify economic activity and improve employment opportunities.



The effect of the implementation of measures concerning the diversification of the rural economy was to be the increase in the economic competitiveness of rural areas, the development of entrepreneurship and the labor market.

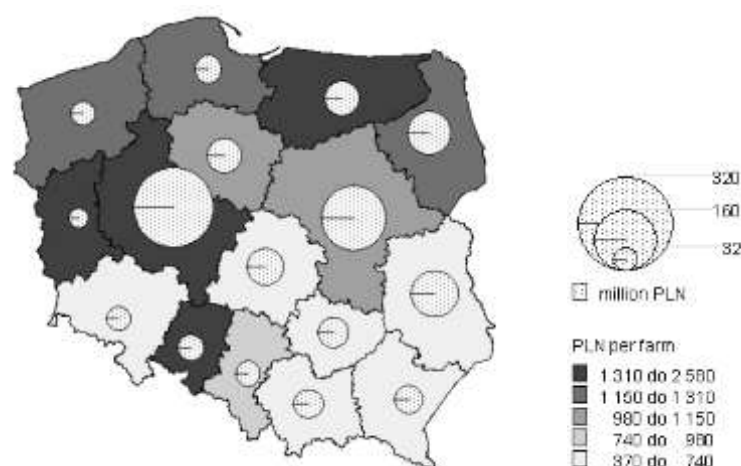
Under axis 3, a total of PLN 3,991.5 million was spent on measures to diversify into non-agricultural activities and support micro-enterprises (tab. 1), which accounted for 27.3% of axis 3 expenditure; 30460 projects were implemented. The allocation of funds under Axis 4 was much smaller and amounted to only 311.7 million PLN or 9.2% of the whole Leader approach; 3,387 projects were implemented. It was found that public expenditure on the creation and development of micro-enterprises dominated in the structure of allocation of total funds for diversification of the economy, accounting for 65% of the total allocation of funds for this purpose. Referring the amount of funds spent on the diversification of the rural economy to the entire RDP budget, it can be concluded that their share was small. Funds designated for starting non-agricultural activities by farmers accounted for 2.04% of total payments under RDPs, while for micro-enterprises support 3.7% of total payments.

**Table 1.** Measures supporting the diversification of the rural economy under the RDP 2007-2013 in Poland.

Axis/ measure	Title of the measure	Total public funds RDP 2007-2013		Number of completed projects	Value of project co-financing (PLN)		
		(PLN million)	%		min	max	average
3/(311)	Diversification into non-agricultural activities	1,375.3	92.8	15,733	91.0	500,000	87,414.4
3/(312)	Establishment and development of micro-enterprises	2,616.2	7.2	14,727	230.5	300,000	177,643.8
4(413_311)	Implementation of Local Development Strategies	142.4	35.3	1,922	5,680	100,000	74,088.8
4(413_312)	Implementation of Local Development Strategies	169.3	64.7	1,465	1,136.5	300,000	115,574.6

Under measure 311 ‘differentiation towards non-agricultural activities’ there was the highest number of beneficiaries – 15,733, of which 82% were farmers, 15% of farmers' spouses, 3% were other household members. One fourth of the beneficiaries were women. As a result of the measure, the number of farmers conducting non-agricultural activity increased by 15,246 persons. Under measure 312 ‘establishment and development of micro-enterprises’, support was granted to 13,496 micro-enterprises, of which 73% are existing enterprises, as was also found in other EU countries [12,8]. The co-financing received from public funds influenced the resignation by farmers from running the farm. As shown by data [10], approximately 24% of the total number of supported micro-enterprises were run by former farmers or their household members.

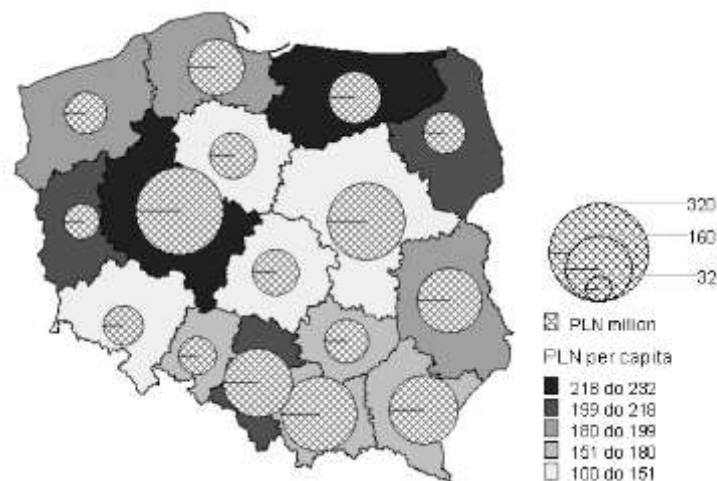
Public support for starting non-agricultural activities under the Leader approach (axis 4) was most often used by farmers who accounted for 86% of beneficiaries, the percentage of female beneficiaries was 26%. As a result of the implementation of projects, the number of farms of farmers running non-agricultural activities increased by 1,812. Under axis 4, 1368 micro-enterprises were supported, of which 70% were existing entities. The share of micro-enterprises run by former farmers or their household members in the total number of micro-enterprises covered by the aid was 16%.



**Fig. 1.** Regional diversification of public funds allocation under measure 311 ‘diversification into non-agricultural activities’ of axis 3 RDP 2007-2013 in Poland [10, 4] .

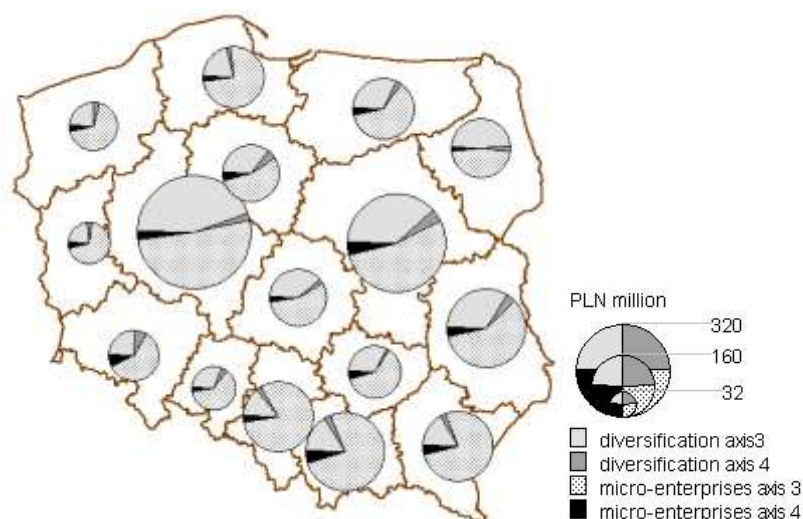
Regional differences in the allocation of public funds supporting the diversification of activities towards non-agricultural activities were found ( Fig. 1). In absolute terms, most funds were spent in the Wielkopolskie (PLN 311.6 million), Mazowieckie (PLN 208.7 million), Lubelskie (PLN 124.5 million) and Podlaskie voivodeships (PLN 103.8 million). Regarding public expenditure in relation to the number of functioning agricultural farms, the largest amounts were spent in the Wielkopolskie voivodeship (PLN 2,572 per farm), Warmińsko-Mazurskie (PLN 1,687 per farm), Opolskie (PLN 1,471 per farm) and Lubuskie (PLN 1,310 per farm). The

smallest allocation of public funds per farm was found in the regions of south-eastern Poland and in the Dolnośląskie voivodeship.



**Fig. 2.** Regional diversification of public funds allocation under measure 312 'establishment and development of micro-enterprises' of axis 3 RDP 2007-2013 in Poland [10, 4].

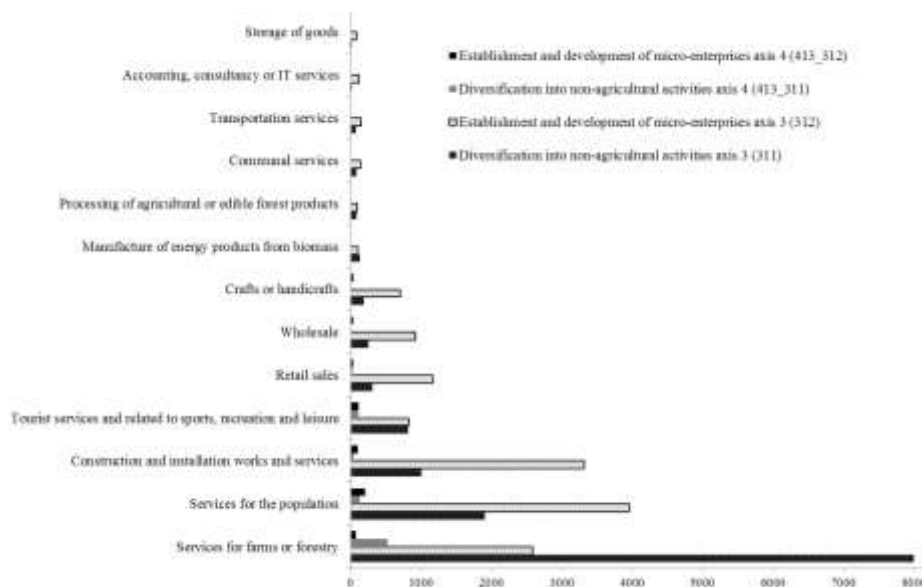
The allocation of funds for the creation and development of micro-enterprises was slightly less varied between regions than for diversification towards non-agricultural activities (Fig. 2). Definitely the most funds were spent in the Wielkopolskie voivodeship - PLN 350.6 million, and the least in Lubuskie and Opolskie (73.7 and 75.4 PLN million respectively). In Central Poland and the Dolnośląskie voivodeship, there were the least funds per capita, while the largest allocation of public funds was in the Wielkopolskie and Warmińsko-Mazurskie voivodeships.



**Fig. 3.** Allocation of public funds for the diversification of the rural economy under RDP 2007-2013 in regions in Poland [10].

In all regions, the importance of financial support for diversification of the rural economy under axis 4 RDP 2007-2013 in relation to axis 3 was marginal (fig. 3). In all regions, with the exception of the Podlaskie voivodeship, the structure of the allocation of funds was dominated by funds supporting the creation and development of micro-enterprises, whose share was between 53% (Wielkopolskie voivodeship) and 83% (Śląskie voivodeship).

Most jobs (fig. 4) were created in services for farms and forestry (39.1% of all jobs), services for the population (21.7%), construction and installation (15.6%), tourism (6.5%), trade (9.7%) and crafts and handicrafts (3.3%). The beneficiaries carried out projects concerning also other activities, but their effects in terms of create new jobs were small. The support for tourism was surprisingly small, taking into account the assumptions of the Programme [11], where agrotourism was indicated as the most important form of possible non-agricultural activities and effects that occurred in other countries, e.g. in Slovakia, where  $\frac{3}{4}$  projects focused on agrotourism [3].



**Fig. 4.** Number of jobs created in Poland as a result of implementation of RDP 2007-2013 activities concerning the diversification of the rural economy by support areas [10].

As a result of the implementation of projects related to the undertaking of non-agricultural activities by farmers, 13,795 jobs were created. More jobs in rural areas (14,790) were created thanks to the support of micro-enterprises, as was the case in Latvia [12]. The increasing number of jobs in the countryside is confirmed by the increase in rural income compared to cities [14]. Target results established in the RDP 2007-2013 in the scope of created jobs have been achieved in the case of axis 3 measures, also due to the reduced allocation of funds in relation to the original assumptions. In the case of measure 312 ‘establishment and development of micro-enterprises’, the results regarding the implementation of workplace indicators, as well as the total value of investments and added value exceeded expectations, although the number of operations and supported micro-enterprises was lower than expected [9]. Nevertheless, it is indicated that the effects of RDP in creation of non-agricultural jobs are insufficient in relation to the needs of unnecessary workforce in the Polish countryside [14], what was also pointed out in the RDP evaluation in the Czech Republic [2].

It was confirmed very little role of Leader approach in the creation of jobs [17], which resulted from a smaller allocation of funds for this purpose. Research shows that activities related to the development of entrepreneurship were the most difficult for local action groups to implement from among all their tasks and caused the most problems [9]. These problems were related to the lack of interest of potential recipients of this type of investment and resulted from difficulties in the process of applying and implementing projects.

## 4 Conclusions

On the basis of conducted research, the following conclusions can be reached:

- RDP 2007-2013 supported the diversification of the rural economy in Poland. The amount of PLN 1,517.7 million from public funds was spent on non-agricultural activities by farmers, and PLN 2,775.5 million on the creation and development of micro-enterprises. The total amount of support aimed at diversifying the economy accounted for 5.8% of total payments under the RDP. Projects implemented under axis 3 were definitely dominant, taking into account the amount of support and the results obtained. The small significance of the Leader approach (axis 4) was found in contributing to changes in the labor market. This resulted from a much smaller allocation of public funds in relation to axis 3 (by 12.8 times) and problems with the implementation of these activities by the local action groups.
- There was regional differentiation of the allocation of public funds spent on the diversification of the rural economy. It was smaller in the case of the development of micro-enterprises, which may mean that the inhabitants of rural areas in Poland are interested in taking up a job on their own account. Among the regions, Wielkopolskie voivodeship distinguished the largest allocation of funds earmarked for both non-agricultural activities and the development of micro-enterprises.
- With the support of RDP 2007-2013, 28,285 jobs were created in rural areas, mainly in the field of agricultural and forestry services, services for the public and construction and installation services. Financial assistance was most often directed to micro-enterprises already existing on the market, only every fourth supported enterprise was a newly created entity.

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# Enterprise Life Cycle and Earnings Management: A Study Based on Mediating Effect of Financing Demand

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**Abstract.** With the data of listed companies in stock markets of Shanghai and Shenzhen from 2009 to 2015, this paper gives an empirical study of earnings management from the dynamic perspective of enterprise life cycle, analyses the impact of enterprise life-cycle stages on earnings management, and then explores the path mechanism that enterprise life cycle influences earnings management from the perspective of financing needs. The results show that enterprise life-cycle stages play an important impact on earnings management. The level of enterprise earnings management in growth and depression period is higher than that in maturity period. In addition, the larger the demand of corporate financing needs, the higher the level of enterprise earnings management, and financing demand is partly mediated in the impact of enterprise life cycle on enterprise earnings management. Therefore, we should further enhance the internal governance of companies, improve the external financial environment and expand the financing channels to restrain enterprise earnings management. What's more, the external investors, supervisors and auditors should pay more attention to the quality of accounting earnings information of enterprises in growth and depression period and reduce the noise of financial information.

**Key words:** Enterprise Life Cycle, Financing Needs, Earnings Management, Mediating Effect.

## 1 Introduction

As an ever-changing dynamic organization, an enterprise will go through different life cycle stages, such as creation, growth, maturity and decline. In each of life cycle stage, the enterprise has its own unique characteristics [10]. For example, the enterprise internal business activities, investment and financing activities, ownership structure and corporate governance and external competition are quite different in different life cycle stages. Therefore, it is necessary to study enterprise earnings management behavior from the dynamic perspective of enterprise life cycle.

According to the theory of enterprise life cycle, enterprises in different life cycle stages have different organizational structure and financial strategy, and there are certain differences between their internal operation and external environment [1].



Therefore, enterprises in different life cycle stages have varying degrees of agency problems, so the motivation and ability of managers in different life cycles enterprises to manipulate earnings will be different. In addition, there are also great differences in corporate culture, management style and market competitiveness between different life cycle enterprise, so enterprises in different life cycle stages often have different levels of earnings management.

In view of this, this paper takes the data of A-share listed companies in Shanghai and Shenzhen stock exchanges from 2009 to 2015 as samples and makes an empirical study on earnings management behavior from the dynamic perspective of enterprise life cycle. The results show that the level of earnings management is significantly different between different life cycle stage. Specifically, compared with mature stage enterprises, growth stage and decline stage enterprises have a higher degree of earnings management, and decline stage enterprises have the highest level of earnings management, followed by growth stage enterprises. Furthermore, this paper discusses the path mechanism of the impact of enterprise life cycle on earnings management from the perspective of financing demand. The results show that financing demand partially mediates the impact of enterprise life cycle on earnings management.

## **2 Literature Review and Hypothesis Development**

### **2.1 Enterprise Life Cycle and Earnings Management**

Enterprises in growth period with more investment opportunities and faster expansion speed, so they always want to show good business performance to attract outside investors to meet financing needs, which will strengthen the manager's motivation for earnings management behavior. The operation activities of mature enterprises are relatively stable, with huge markets share and strong profitability, and can generate a large amount of cash flow to meet their own capital needs. Moreover, mature enterprise governance structure and internal control system are relatively more perfect. All of that will lead to a lower level of the enterprise earnings management in mature period. Enterprises in decline period generally accompanied by customer loss and market share reduction, and the company financial situation have deteriorated significantly. In order to obtain external funds to maintain development and avoid the supervision of securities market, showing good business performance is essential, therefore, management of these enterprises will improve performance through earnings management [3]. Moreover, the principal-agent problem of enterprises in the decline period is further highlighted, and managers may conduct more earnings management behavior out of self-interest motivation. Thus, we hypothesize:

H1: The life cycle of enterprise is an important factor to determine the level of earnings management. Compared with mature enterprises, growth and decline enterprises have a higher degree of earnings management.

## **2.2 Enterprise Life Cycle and Financing Demand**

The financing needs of enterprises in different life cycle are significantly different. Enterprises in growth period are faced with more development opportunities, however, most enterprises in growth period have not yet formed a stable profitability. The cash flow provided by their own is insufficient to support their external expansion needs. Therefore, enterprises in growth period usually have huge demand for external capital. Enterprises in mature period have relatively stable customer groups, large market share and strong profitability, which could produce sufficient cash flow to meet their capital need. Moreover, compared with growth period enterprise, the growth rate of enterprises in mature stage have slowed down, so their external financing needs will be reduced. Enterprises in decline stage generally have terrible living conditions and development difficulties, And the cash flow generated by them is usually difficult to maintain the company normal and sustainable development, so they have a greater demand for external financing [2]. Formally stated, we hypothesize:

H2: The life cycle of enterprise is an important factor in determining its financing needs. Compared with mature enterprises, growth and decline enterprises have greater financing demand.

## **2.3 Corporate Financing Needs and Earnings Management**

Many scholars have found that accounting information is an important base for equity investors and creditors to sign contracts with enterprises [9]. Therefore, the accounting information will be more probably managed to some extent when there is financing demand [11]. The debt contract hypothesis holds that creditors understand the financial situation of an enterprise based on its financial statements inducing managerial motivation for earnings management. Because the better operating performance reflected by accounting information, the creditors will provide them with loans of larger amount and lower cost. Under such circumstances, it is a common phenomenon for managers to whitewash their statements in order to meet the harsh conditions of bank loans [12,5]. Moreover, many scholars have found that in the process of equity financing, earnings management can also be carried out to a certain degree [4]. Thus, we hypothesize:

H3: The financing demand of enterprises will have an impact on earnings management, and the higher the financing demand, the higher the level of earnings management.

H4: Financing demand partially mediates the impact of enterprise life cycle on earnings management.

### 3 Research Design

#### 3.1 Model Design

We use model (1) to test the impact of enterprise life cycle on earnings management:

$$DA = \alpha_0 + \alpha_1 GP1 + \alpha_2 GP3 + \alpha_3 Size + \alpha_4 Debt + \alpha_5 Roe + \alpha_6 Tar + \alpha_7 Audit + \alpha_8 Mc + \alpha_9 Cr\_10 + \varepsilon \quad 1$$

We construct model (2) to test the impact of enterprise life cycle on financing demand:

$$P(Fn = 1) = \frac{1}{1 + e^{-(\beta_0 + \beta_1 GP1 + \beta_2 GP2 + \beta_3 Size + \beta_4 Debt + \beta_5 Roe + \beta_6 Tar + \beta_7 Fl + \beta_8 Cr\_10)}} \quad 2$$

We use model (3) to examine the impact of financing demand on earnings management:

$$DA = \gamma_0 + \gamma_1 Fn + \gamma_2 Gp1 + \gamma_3 GP3 + \gamma_4 Size + \gamma_5 Debt + \gamma_6 Roe + \gamma_7 Tar + \gamma_8 Audit + \gamma_9 Mc + \gamma_{10} Cr\_10 + \varepsilon \quad 3$$

Among them, *DA* represents earnings management. Independent variables include growth period (*GP1*), maturity period (*GP2*) and decline period (*GP3*). Mediator variable is financing demand  $P(Fn = 1)$ . The control variables include *Size*, *Debt*, *ROE*, *Tar*, *Fl*, *Audit*, *Mc*, and *Cr\_10*.

#### 3.2 Key Variable Measure

**Enterprise Life Cycle.** This paper divides the enterprise life cycle according to the research by Dickinson [6], which has been adopted by many scholars. The life cycle divided results are reported in table 1.

**Table 1.** Enterprise life cycle divided results.

	Growth Period	Growth Period	Mature Period	Decline Period	Decline Period	Decline Period	Decline Period	Decline Period
	1	2		1	2	3	4	5
Net Cash								
Flow from	-	+	+	-	+	+	-	-

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Operation								
Net Cash								
Flow from	-	-	-	-	+	+	+	+
Investment								
Net Cash								
Flow from	+	+	-	-	+	-	+	-
Financing								

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**Financing Demand.** The method used to measure financing demand is proposed by Demirguc-Kunt and Maksimovic [7]. This model capture the financing demand through the difference between total assets real growth rate and sustainable growth rate. The formula is as follows:

$$Fn = (A_t - A_{t-1}) / A_{t-1} - Roe_t / (1 - Roe_t) \quad 4$$

$A$  represents total assets of the company, and  $Roe$  represents the return on equity.  $Fn$  is used as the proxy for financing demand, when the  $Fn$  value is greater than the industry's annual average, then which will be assigned to 1, indicating that the company's financing demand is larger. Otherwise  $Fn$  will be assigned to 0, indicating that the company's financing demand is smaller.

**Earnings Management.** Based on the cross-sectional modified Jones model [8], this paper calculates the accrued earnings management by year and by industry regression to represent the degree of enterprise earnings management.

### 3.3 Sample Selection and Data Sources

We take the financial data of A-share listed companies in Shanghai and Shenzhen stock exchanges from 2009 to 2015 as the research sample. All the data come from CCER database. Referring to previous studies, the following steps were carried out to samples:

1. We eliminate financial and insurance industry companies, companies with incomplete research data, and ST, PT companies.
2. We winsorize the extreme 1% of the distribution of acquisition activity variables to reduce the effects of extreme observations.
3. Because the previous period of data is needed to calculate the accrued earnings management, the regression analysis of this paper finally uses 11963 valid samples between 2010-2015, using Stata12 to process data. Variable definitions and instructions are detailed in Table 2.

**Table 2.** Variable definitions and instructions.

Variable Name	Variable Symbol	Variable Description
Earnings Management	<i>DA</i>	Calculate according to the cross-sectional modified Jones model, then take absolute value to represent enterprise earnings management
Financing Demand Probability	$P(Fn=1)$	The larger probability of corporate financing demand
Growth Period	<i>GP1</i>	The <i>GP1</i> equals one if the enterprise in growth period, otherwise is 0
Mature Period	<i>GP2</i>	The <i>GP2</i> equals one if the enterprise in mature period, otherwise is 0
Decline Period	<i>GP3</i>	The <i>GP3</i> equals one if the enterprise in decline period, otherwise is 0
Financing Demand	<i>Fn</i>	The <i>Fn</i> equals one if the enterprise with larger financing needs, otherwise is 0
Company Size	<i>Size</i>	The total assets of the company are taken logarithm
Asset Liability Ratio	<i>Debt</i>	Ratio of total liabilities to total assets
Return on Net Assets	<i>Roe</i>	Ratio of net profit to shareholders' equity
Turnover of Total Assets	<i>Tar</i>	Ratio of operating income to total assets
Financial Leverage	<i>Fl</i>	Ratio of total liabilities to shareholders' equity

Establishment of Audit committee	<i>Audit</i>	The dummy variable, the enterprise with an audit committee assigns to 1, otherwise is 0
Executive Monetary Compensation	<i>Mc</i>	The total amount of the top three executives payments are taken logarithmic
The Top Ten Majority Shareholding Ratio	<i>Cr_10</i>	Shares held by the top ten shareholders

## 4 Empirical Results

### 4.1 Single Factor Analysis

In this paper, the mean test (independent sample T test) and the median test (rank sum test) are used to test whether there are significant differences of enterprise earnings management in different life cycle stages. According to Table 3, whether the mean test (T values are 15.0515 and 20.7615, significant at the 1% level) or the median test (Z values are 13.338 and 20.488, significant at the 1% level), shows that there are significant differences in the degree of earnings management between enterprises in different life cycle stages. Moreover, the level of earnings management of enterprises in growth and decline periods is higher than that of mature enterprises, indicating that the second half of hypothesis 1 is verified.

**Table 3.** Single factor analysis of enterprise earnings management level in different life cycle.

The Mean Test				The Median Test		
Growth period – Mature period	Growth period <i>DA-mean</i>	Mature period <i>DA-mean</i>	T value	Growth period <i>DA-median</i>	Mature period <i>DA-median</i>	Z value
	0.0893	0.0649	15.0515***	0.0632	0.0484	13.338***
Decline period – Mature period	Decline period <i>DA-mean</i>	Mature period <i>DA-mean</i>	T value	Decline period <i>DA-median</i>	Mature period <i>DA-median</i>	Z value

period	0.1061	0.0649	20.7615***	0.0838	0.0484	20.488***
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Notes: Data is calculated by Stata12.0.

\*\*\*, \*\*, \* significant respectively at 1 percent, 5 percent, 10 percent level.

In addition, the mean test (independent sample T test) and the median test (rank sum test) are used to verify whether there are significant differences in the financing demand of enterprises in different life cycles. According to Table 4, whether the mean test (T value is 57.2297 and 10.5158, significant at the 1% level) or the median test (Z value is 49.633 and 10.424, significant at the 1% level), shows that there is a significant difference in the degree of financing demand between enterprises in different life cycle stages. And compared with mature enterprises, the degree of financing needs of enterprises in growth and decline periods is higher than that of mature enterprises, indicating that the second half of hypothesis 2 is verified.

**Table 4.** Single factor analysis of enterprise financing demand degree in different life cycle.

The Mean test				The Median Test		
Growth– Mature period	Growth	Mature	T value	Growth	Mature	Z value
	period	period		period	period	
	<i>Fn</i> -mean	<i>Fn</i> -mean		<i>Fn</i> -median	<i>Fn</i> -median	
	0.6026	0.1088	57.2297***	1	0	49.633***
Decline – Mature period	Decline	Mature	T value	Decline	Mature	Z value
	period	period		period	period	
	<i>Fn</i> -mean	<i>Fn</i> -mean		<i>Fn</i> -median	<i>Fn</i> -median	
	0.2072	0.1088	10.5158***	0	0	10.424***

Notes: Data is calculated by Stata12.0.

\*\*\*, \*\*, \* significant respectively at 1 percent, 5 percent, 10 percent level.

## 4.2 Regression Results Analysis

In this paper, models (1) and models (3) are regressed by ordinary least square method and the regression results of models (1) and models (3) are shown in Table 5. we can see that the positive effects of growth period and decline period on enterprise earnings management have passed 1% significant test, and the empirical results support the hypothesis 1. The regression results of model (3) show that the positive impact of

corporate financing demand on earnings management has passed 1% significant test. This result shows that the greater the demand for external funds, the higher the level of management earnings will be, which indicate the hypothesis 3 is verified. From other control variables, in the regression results of model (1) and model (3), the negative impact of enterprise assets scale on earnings management have all passed the 1% significance level test, which shows that the larger the scale of enterprises is, the lower the degree of earnings management, because the internal governance structure of larger enterprises is relatively perfect. The top ten shareholders equity ratio has a positive impact on earnings management, and has passed the 1% significance test, indicating that relatively decentralized ownership structure is conducive to restraining earnings management.

In this paper, model (2) is used logit regression. From table 5, we can see that both the growth period enterprises and the decline enterprises are positively related to the financing demand, and have passed the 1% significance level test, which shows that compared with the mature enterprises, the financing demand of the growth period enterprises and the decline enterprises is much larger. Hypothesis 2 has got the empirical results support. There is a negative correlation between the size of enterprises and the financing demand at a significant level of 1%, which indicates that compared with large enterprises, small enterprises need more external capital. These empirical results also indicate that the government should introduce more policies to broaden the financing channels for small enterprises. According to table 5, enterprise life cycle has a significant impact on earnings management. At the same time, the impact of enterprise life cycle on financing demand and the impact of financing demand on earnings management are also significant. This shows that the path mechanism of enterprise life cycle influences the company's earnings management through financing demand does exist. In other words, financing demand partially mediates the impact of enterprise life cycle on earnings management. Hypothesis 4 has got empirical results support.

**Table 5.** Regression results of life cycle, financing demand and earnings management.

	Model (1)		Model (2)		Model (3)	
	Explanatory		Explanatory		Explanatory	
Independent Variable	variable	T value	variable	Z value	variable	T value
	<i>DA</i>		<i>P(Fn=1)</i>		<i>DA</i>	
<i>GPI</i>	0.0281***	24.35	2.4508***	41.22	0.0121***	6.83
<i>GP3</i>	0.0381***	17.68	0.6173***	7.78	0.0353***	16.68
<i>Fn</i>					0.0350***	20.69



<i>Size</i>	-0.0187***	-23.53	-0.1641***	-6.94	-0.0176***	-22.47
<i>Debt</i>	0.0161***	3.56	2.0670***	10.13	0.0018	0.40
<i>Roe</i>	0.0015	0.50	-2.7438***	-11.32	0.0075**	2.52
<i>Tar</i>	0.0162***	12.16	-0.2861***	-5.71	0.0177***	13.48
<i>Audit</i>	0.0001	0.06			0.0003	0.11
<i>Mc</i>	-0.020*	-1.71			-0.0019	-1.64
<i>Cr_10</i>	0.0682***	14.20	1.4343***	9.16	0.0606***	12.79
<i>Fl</i>			0.0465*	1.77		
<i>_cons</i>	0.4436***	24.35	0.4744	0.95	0.4196***	23.39
<i>Year</i>	yes		yes		yes	
<i>Industry</i>	yes		yes		yes	
N	11963		11963		11963	
	Adj-R <sup>2</sup>		Pseudo R <sup>2</sup>		Adj-R <sup>2</sup>	
	0.1286		0.2390		0.1587	
F value	57.94***				71.52***	

Notes: Data is calculated by Stata12.0.

\*\*\*, \*\*, \* significant respectively at 1 percent, 5 percent, 10 percent level.

## 5 Conclusion

This paper studies the earnings management from the dynamic perspective of enterprise life cycle and explores the path mechanism of the impact of enterprise life cycle on earnings management from the view of financing demand. The results show that there are significant differences of earnings management in different life cycle, and growth and decline periods have a significant positive impact on the level of enterprise earnings management. Moreover, empirical results support that financing demand plays a mediation role in the impact of enterprise life cycle on earnings

management. The results illustrate that compared with mature enterprises, enterprises in growth and decline periods have greater financing needs, and the greater demand of corporate financing, the higher level of earnings management. The result of this research not only provides empirical evidence for the effect of enterprise life cycle on earnings management, but also partly explains how the enterprise life cycle affects earnings management.

The research of this paper will not only help to enrich the study of earnings management behavior, but also can help the external stakeholders to better identify the earnings management behavior of enterprises and understand the real financial situation of the enterprises to some extent. The revelation of this study is as follows. Firstly, we should further perfect internal governance (such as improving management pay structure and internal control) to restrain earnings management activities and reduce financial information noise. Besides, external investors, regulators and auditors should pay more attention to the quality of accounting earnings information of enterprises in growth and decline periods. Secondly, we should further enhance the external financing environment, expanding financing channels, and building financing platform to solve the problem of financing difficulties.

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## Industry 4.0: The Organizational Culture Perspective

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**Abstract.** Industry 4.0 has been a hot topic for the researchers in the recent years. However, much of the research up to now has been about the technological aspects of Industry 4.0. This paper focuses on the organizational culture perspective by examining the level of organizational culture in organizations in the Czech Republic using the Organizational Culture Index. Hofstede's model of six dimensions of national cultures is considered in his paper as well in order to get a better understanding of the possible uses of this model for defining preconditions for implementing industry 4.0 from the point of view of organizational culture. It is safe to assume that the Innovative culture is one of the pre-conditions for implementing Industry 4.0 because it is more flexible and deals with risk better than the other types of the organizational culture, we can then speculate that innovative culture does not depend on the size and/or the type of the organization.

**Keywords:** Industry 4.0, Organizational Culture, Readiness.

### 1 Introduction

Industry 4.0 is known to be the essence of the fourth Industrial revolution. By applying and using cyber-physical system (CPS) in order to grasp high levels of automation, Industry 4.0 is currently being used in manufacturing [13]. The Cyber-Physical System is the base for smart factories and this is possible by interconnect sensors, machines and IT systems inside the value chain through enterprise boundaries [6].

The review of literature exposed that the technological features of Industry 4.0 concept have been very well studied and documented. Nevertheless, the other features such as those regarding organizational culture have been understudied. Without a doubt the technological aspect of the Industry 4.0 holds a significant importance for this concept but this does not mean that other aspect are less important.

Generally foreign sources were used for composing the Literature review of this paper to have a rather more international view towards the research.

The objective of the paper is to inspect the organizational culture in organizations in the Czech Republic to find out what kind of organizational culture they have and which kind of culture is more appropriate for the implementation of Industry 4.0 in order to choose appropriate managerial methods and approaches to help prepare firms for the implementation of Industry 4.0 concept.

In order to realize the objective of this work the Wallach's Questionnaire (1983) has been chosen as the utmost fitting method for the research. Furthermore, the Hofstede's model of six dimensions of national cultures is examined in connection to this work to find out if it would be possible to use it for defining the organizational culture preconditions for implementing industry 4.0.

## **2 Theoretical Background**

The 1st industrial revolution occurred once mechanical production facilities were powered by making use of water and steam by the end of 18th century. The 2nd industrial revolution followed in the beginning of the 20th century when electrical energy was introduced to mass production and division of labor was utilized. The 3rd industrial revolution is believed to be when information technologies and electronics were utilized to reach automation of production in beginning of 1970s. The Industry 4.0 concept (Industrie 4.0) is considered to be the description for the 4th industrial revolution and it was originated in Germany. The use of Cyber-Physical Systems (CPS) made this possible [14].

“Industry 4.0 concept can be characterized as a transformation of production as separate automated factories into fully automated and optimized manufacturing environments. Production processes are linked vertically and horizontally within enterprise systems” [6]. Industry 4.0 is currently being used in manufacturing by utilizing cyber-physical systems in order to attain high levels of automation [13]. The Cyber-Physical System (CPS) is considered to be the footing for smart factories because it is able to interconnect sensors, machines and IT systems within the value chain throughout enterprise boundaries [6].

In general the idea of Industry 4.0 could be explained as a transformation of production as single automated factories into entirely automated and optimized manufacturing surroundings, where production processes are linked vertically and horizontally inside enterprise systems [2].

Automation is typically acting, functioning, or self-regulating lacking the human involvement. This basically means that the human intervention is cancelled partially or entirely in the implementation of scientific, administrative, industrial, or household tasks and duties [7].

“The platform Industry 4.0 itself has divided its main areas of focus across five different working groups up: Reference Architecture; Standardization; Research and Innovation; Networked Systems Security; Legal Environment; and Work, Education/Training” [4].

Industry 4.0 necessitates considerable investment from the beginning, and for that reason a larger interest of companies in industry 4.0 would perhaps be originated by government incentives or subsidies [6].

Industry 4.0 describes the organization of production processes that are founded on cooperating technologies and devices that are called ‘smart’ factory. Physical processes are controlled by computer-driven systems in a smart factory with making decentralized decisions that are dependent on the self-organization mechanisms [4].

Organizational culture is the set of mutual beliefs, principles, values, and assumptions that formulate the behavior by building commitment, giving direction, forming a collective identity, and constructing a community. An organizational culture is considered to be effective when it is in alignment with the organization's resources, environment, values, and objectives [8].

Culture of an organization consists of common beliefs, attitudes, assumptions, and expectations guiding behaviors the law or clear directions are lacking. "Culture could be a powerful resource of common identity purpose and flexible guidelines" [1]. Weak organizational culture avoids people from sharing their knowledge in order to preserve personal power and their efficiency [1].

The path to success in an uncertain environment like Industry 4.0 is to pay attention to training, learning, and innovation capability. Organizational training, learning, and innovations are strongly reliant on the role of employees in the organization and that is why organizations have to formulate their strategies according to what they want and expect from their employees [9].

Organizations have to have more flexibility, responsiveness and efficiency due to the fact that the global business environment has a highly unpredictable nature and also because of the necessity to respond to challenges that are coming from both local and international competition. This means that there is a greater need for continuous innovation of products and services and more importantly internal processes and behaviors [10].

Employee knowledge is necessary for organizations in order to become innovate and to develop a competitive advantage. Hence, it is essential to know how to form an organizational climate that encourages innovation among employees [10].

There are three types of organizational cultures: bureaucratic culture, innovative culture and supportive culture [12]. Bureaucratic, supportive, and innovative cultures have an association with employees work performance with diverse results; and it is important to pay attention to an innovative culture that is empowering for improving employee performance. Innovative culture increases creativity and it is known to be results-oriented, and therefore stimulation and challenges became the driving force of performance. In general, organizational culture is closely associated with behavior in the workplace and mainly in individual performance [11].

The six dimensions of national cultures in the Hofstede's model are as follows:

**1. Power Distance:** is associated with the various solutions to the simple problem of human inequality; "Power Distance has been defined as the extent to which the less powerful members of organizations and institutions (like the family) accept and expect that power is distributed unequally" [5]. This awakens cultural features that are fixed in social inequality like prosperity, power and prestige. Those cultures that have high PD have a tendency to care for an elite social class above the wellbeing of the others. We can frequently see such behavior in the corporate culture as well where elite groups of managers are known to have a superior, indisputable social standard. This kind of cultures tend to hierarchical and to have a lot of respect for elders [2].

**2. Uncertainty Avoidance:** is linked to the level of stress in a society that is dealing with the unknown future and it is not the same thing as "risk avoidance". Uncertainty Avoidance "deals with a society's tolerance for ambiguity" [5]. Uncertainty avoiding

cultures attempt to reduce the likelihood of unstructured situations by firm laws and rules [5]. Controls are created by the support of Rules, technology and religion in order to avoid or decrease uncertain situations in the future. In those countries where there is high Uncertainty Avoidance culture, bureaucratic system are commonly developed to be able to deal with unexpected circumstances with a precisely and clear set of rules [2].

**3. Individualism vs. Collectivism:** “is the degree to which people in a society are integrated into groups” [5]. The possibility that everybody is watching out for themselves and their immediate family is more on the individualist end, but it is evident that people tend to care more about the group on the collectivist end. “This dimension is bi-polar as it expresses individualism vs. collectivism. The more “collectivist” a country is the less individualism it enjoys” [2].

**4. Masculinity vs. Femininity:** is about the division of emotional roles among women and men and the spreading of morals among the genders [5]. The emphases of the Feminine culture is on relationship, helping people, and the physical surroundings. The focus of the masculine culture conversely is chasing money, success, progression and profession [2].

**5. Long Term vs. Short Term Orientation:** this refers to “the choice of focus for people's efforts: the future or the present and past” [5].

**6. Indulgence vs. Restraint:** connected to the satisfaction versus control of elementary human needs associated with enjoying life.

### 3 Objectives and Methodology

The objective of the paper is to inspect the organizational culture in organizations in the Czech Republic to find out what kind of organizational culture they have and which kind of culture is more appropriate for the implementation of Industry 4.0 in order to choose appropriate managerial methods and approaches to help prepare firms for the implementation of Industry 4.0 concept.

The following research questions have been formulated in connection with the objective of the paper, which examines organizational culture in the context of the 4th Industrial Revolution in the Czech Republic:

RQ1: Do organizations in the Czech Republic have the type of organizational culture that supports the implementation of the Industry 4.0 concept?

RQ2: Is innovative culture dependent on the size and/or the type of the organization?

For the purpose of this paper literature review, methods of description, and induction and deduction reasoning were used. Wallach's Questionnaire (1983) - Organizational Culture Index (OCI) in Czech language was selected as the most suitable method for the purpose of this research.

### 4 Results and Discussion

The organizational culture has been categorized into three dimensions: bureaucratic, supportive, and innovative [12] Bureaucratic culture is referred to the type of culture

that is a prominent hierarchical organization and is very organized with a clear definition for authority. The supportive culture is based on mutual trust, encouragement and co-operation and its focus is mostly on interpersonal relationships and it. Innovative culture is believed to be dynamic, it helps and promotes creative work, carries new challenges and encourages risky behavior; And this is the type of organizational culture that seem to be the most convenient culture for the implementation of Industry 4.0.

Therefore if organizations in the Czech Republic have such features like innovative organizational culture in accordance with the organizational culture index, then it is safe to say that the organizational culture of is supportive or Czech organizations are ready for implementing Industry 4.0.

The Hofstede's dimensions of culture could be considered with or as a support to the Organizational Culture Index to explain the readiness of the organizations. For instance, in those countries which there is high uncertainty avoidance, they try to deal with the unexpected situations with accurately defined set of rules and consequently they develop systems that are bureaucratic.

## **5 Conclusions**

It is safe to assume that the Innovative culture is one of the pre-conditions for implementing Industry 4.0 because it is more flexible and deals with risk better than the other types of the organizational culture, we can then speculate that innovative culture does not depend on the size and/or the type of the organization.

By the correct use Wallach's' model and/or Hofstede's Model it is possible to find out about the type of culture in organizations that are we dealing with when preparing them for implementing 4.0, and as a result more appropriate approaches and strategies could be chosen in accordance with the type of culture and therefore the company's transition towards Industry 4.0 would go smoother and easier and potentially the costs of such transition would be reduced.

The results of this research could be beneficial in the defining and adjustment of strategy and methodology for preparing firms in order to implement Industry 4.0 in terms of increasing the efficiency of human resource utilization and subsequently cost reduction and better overall economic outcomes of the firms.

Hofstede's model together with Wallach's model could provide us a decent awareness of the existing organizational climate of the firms and the appropriate approaches and strategies could be selected based on this knowledge in order to make some adjustments and to prepare firms in such ways that they meet the proper preconditions for implementing Industry 4.0 for better and more efficient transition.

For successful implementation of Industry 4.0, it is significantly important to pay attention to its social aspects and particularly the organizational culture and take them into consideration as well as the technological aspects.



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## Direct Payments as a Form of Small Farm Support in Poland

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**Abstract.** The aim of the study is to present the basic rules for granting direct payments in Poland, as well as to determine the directions for the distribution of these funds in the group of small agricultural holdings from the Lesser Poland Province, actively using the CAP funds. Direct payments were one of the first instruments to support Polish agriculture, which was implemented just after Poland's accession to the European Union. They were introduced in Poland in the form of the so-called single area payment schemes (SAPS). A review of studies on the directions of using funds obtained under direct payments by small agricultural holdings indicates that they usually constitute a source of financing current expenditure and purchases of revolving production means. In the presented research the authors focus on the selected group of small agricultural holdings, showing pro-development orientation. The results of the research showed that the funds from direct payments were used primarily by the surveyed small farmers to finance investments on the farm and production expenses related to agricultural activity. To a small extent, these funds were used for current expenses of households. It can be stated that farmers who receive investment subsidies in the framework of CAP programs are more willing to spend funds from direct payments on development activities and treat direct payments as the source of investment financing, complementary to the subsidies.

**Keywords:** Direct Payments, Small Farms, Common Agricultural Policy.

### 1 Introduction

The state's agricultural policy is a way of influencing the development of agriculture. It shapes economic and social relations in agriculture and creates links between this sector and the whole economy. It is one of the forms of state intervention in a functioning market mechanism. The reason for this intervention is the specific characteristics of agricultural production, which relate both to individual factors of production, the state of agriculture, as well as production time. These features have the character of objective conditions and are associated with the specificity of the agricultural sector. They also concern the occurrence of market failure, as well as the need to redistribute income, because the agricultural sector is characterized by lower profitability, and part of the value added generated by agriculture is captured by non-agricultural sectors.

Intervention policy towards agriculture is implemented in the European Union primarily in the framework of the common agricultural policy. One of its basic objectives is to provide agricultural producers with an adequate level of income. Currently, the level of agricultural income is determined more and more by cash transfers implemented under the common agricultural policy, especially through direct payments. Direct payments were introduced into agricultural legislation in 1992 as part of the reform of the Common Agricultural Policy (the so-called Mac Sharry reform). The concept of this system was based on the striving to eliminate the dependence between the size of agricultural production and the amount of financial support for farmers. Initially, direct payments were limited in scope and were not used in all sectors of common agriculture. Over time, however, this range was systematically extended to include new products. As a result of successive reforms carried out since 2003, the so-called "Separation of payments from production" has been introduced (what means that the relationship between direct payments for farmers and the type and quantity of products produced by them has been abolished), more stringent rules for environmental protection and animal welfare have been introduced, which farmers must comply with in order to obtain payments, as well as changes in the rules distribution of financial resources were made. In addition, since 2015, economically active farmers in the European Union are covered by the mandatory payment system used in all EU countries, and they also have access to voluntary schemes, if they exist at the level of a given country [10]. It is worth noting here that as a result of successive reforms of the Common Agricultural Policy, direct payments became an important instrument of this policy, responsible not only for the support and stabilization of agricultural income, but also the maintenance of agricultural land in good agricultural culture, consistent with the idea of environmental protection, compensation costs related to fulfilling community requirements (in terms of quality and production methods) related to the supply of non-productive public goods, ensuring equal conditions of competition within the single agri-food market, as well as a tool helpful in meeting new challenges related to the protection of natural resources, climate change, water management, biodiversity or renewable energy [3,12].

Direct payments play a significant role in shaping the economic situation of farming families in Poland, as evidenced by the relationship between the total number of agricultural holdings, the number of registered producers, i.e. holdings that can apply for direct payments and the number of applications submitted. Most applications are submitted in provinces with the most fragmented agriculture structure [13]. Numerous studies conducted in Polish agricultural holdings indicate two significant results of direct payments. Firstly, they undoubtedly contribute, albeit to varying degrees depending on the size of the farm, to an increase in the income of Polish farmers. Secondly, taking into account the results of research on the directions of the use of direct payments by farmers, it is indicated that they are largely social. While in large-scale agricultural holdings they affect capital accumulation and, consequently, investment, in small agricultural holdings they usually constitute a source of financing current expenditure and purchases of revolving production means, such as plant protection products or animal feed [4, 7, 8, 9, 13, 17]. Therefore, it is important to precisely identify the directions of using funds obtained under direct payments,

especially in the group of small agricultural holdings, which dominate in the area structure of Polish agriculture.

## 2 Purpose and Methodology of Research

Issues related to the distribution of funds coming from direct payments by farmers owning small agricultural holdings were discussed by various authors whose research indicated that these funds are rarely spent on investment purposes related to the development of a farm. In the presented research the authors focus on the selected group of small agricultural holdings, showing pro-development orientation. The aim of the study is to present the basic rules for granting direct payments in Poland, as well as to determine the directions for the distribution of these funds in the group of small agricultural holdings, actively using CAP funds for investment purposes.

The study uses the results of surveys, which were carried out in 2016 in the group of small agricultural holdings from the Lesser Poland Province, which in the years 2004-2015 received direct payments and at least once received investment support within the framework of the following CAP programs:

- Sectoral Operational Program "Restructuring and Modernization of the Food Sector and Rural Development 2004-2006";
- Rural Development Plan 2004-2006;
- Rural Development Program 2007-2013.

In order to obtain a representative sample the stratified random sampling technique was applied. The stratifying feature was the number of small farms located in a given poviat of the Lesser Poland Province. In the survey the proportional allocation was applied, what means that in the sample each stratum had a representation proportional to its share in the population. In order to estimate the minimum sample size the following formula was used [16]:

$$n = \frac{\frac{1}{4} \cdot N}{N \cdot \frac{d^2}{Z_{\alpha/2}^2} + \frac{1}{4}}$$

where:

$N$  - the size of the population to which the inference applies,

$d$  - statistical error,

$Z_{\alpha/2}$  - value of a random variable  $Z$  with a standardized standard distribution for which

$P(|Z| \leq Z_{\alpha/2}) = 1 - \alpha$

It was assumed that the maximum statistical error may be  $\pm 5\%$  and it will be calculated with the confidence level  $(1 - \alpha)$  equal to 0.9. The necessary minimum sample size was set at 266 small farms, and the research covered finally a representative group

of 296 small agricultural holdings from the Lesser Poland Province. The sampling scheme, which was used, and a sufficiently large sample size guaranteed the representativeness of the survey's results, what means that the conclusions based on the research can be applied to the entire surveyed population of small farms from the Lesser Poland Province, active in the field of obtaining EU funds [18].

The delimitation of agricultural holdings is made according to various criteria, and in the European Union many attempts are made to define the category of a small farm [6,15]. However, there are large differences between individual Member States, which means that none of the definitions can be considered as commonly used [5,11]. For research purposes, a small agricultural holding was defined as agricultural holding with the agricultural area of 1 to 5 ha at the moment of conducting the research. This assumption, however, caused, that also low-scale but specialized agricultural holdings were surveyed. However, when analyzing the problem of the state of agriculture and agricultural holdings in Poland, it is necessary to take their area size into account, as it is currently largely at the discretion of the production and economic capabilities of many agricultural holdings.

Small farms in Poland have a dominant share in the structure of agricultural holdings. In 2016 in the country there were 737.2 thous. farms with an area of 1 to 5 ha of agricultural land, which accounted for 52.3% of all agricultural holdings. Spatial distribution of small farms shows large variations, hence their share in the total number of farms in particular provinces of Poland is in the range of 27.0% - 80.9%. The highest share of small farms is in the Lesser Poland Province, where there are 113.2 thous. farms with such a small area [2]. The selection of the territorial scope of the research was therefore deliberate, because the Lesser Poland Province belongs to regions in Poland that have the most fragmented agrarian structure. Agriculture in this region is characterized by a large spatial diversity, which is determined to a large extent by the natural conditions prevailing there. The best soil and climatic conditions occur only in the northern and central part of this Province. In the southern part, usually mountainous, none of the elements of the natural environment is conducive to the agricultural economy [19].

In order to determine, what the funds from direct payments were allocated for, three groups of expenses were distinguished:

- production expenses related to current agricultural activity, which include the purchase of plant protection products, fertilizers and feed as well as other current expenditure,
- investment expenses, which include expenditure on the construction, renovation or modernization of farm buildings, purchase of tractors, agricultural equipment and machinery, purchase of land or animals and other investment expenditure,
- current expenditure of the farmer's household, i.e. non-production expenditure, intended for consumption purposes.

### 3 Basic Rules for Granting Direct Payments in Poland

In 2014-2020, there are basically two direct payment schemes in the European Union. The first one is the basic payment system (BPS - Basic Payment Scheme), which is used in the EU-15 and in Croatia, Malta and Slovenia. In this system, payments are granted to the farmer on the basis of its rights. The second direct payment system is the Single Area Payment Scheme (SAPS). In this system there are no payment entitlements, and the single area payment rate is calculated by dividing the annual national financial envelope, determined for each country by the area of eligible land. It is possible to use the same types of payments in the SAPS system that are used in the basic payment system.

The SAPS binding in Poland consists of compulsory and voluntary elements. In 2018, the following types of payments are implemented in Poland under direct payments [14]:

- uniform area payment,
- payment for greening,
- payment for young farmers,
- additional payment,
- payments related to production:
  - animal production sector: cattle, cows, sheep, goats,
  - plant production sector: leguminous plants for grain, forage plants, sugar beets, starch potatoes, tomatoes, strawberries, hops, flax and fibrous hemp,
- transitional national support (non-production tobacco payment).

The rates for specific payments are calculated as the quotient of the annual financial pool for a given payment and the number of hectares or animals eligible for a given type of payment in a given year. A condition for granting appropriate assistance is also possession of at least 1 ha of eligible lands. The minimum area of a single agricultural parcel, which may be covered by area payments, is 0.1 ha. In the case of support linked to livestock production, no surface criterion is required, but the payment amount must be at least EUR 200. Payments may also cover areas occupied by landscape elements located within the areas declared for payment.

Direct payment support may be granted to a person who actually uses the land, maintains it in good agricultural and environmental condition (in accordance with the standards) and complies with the cross-compliance requirements. This support is granted to those areas of agricultural land that are used throughout the calendar year (with some exceptions) to conduct agricultural activity or mainly agricultural activity. In addition, under the new regulations, applications for area-related payments, i.e. applications for direct payments and area payments under the RDP (i.e. agri-environmental, organic, LFA and afforestation payments), is submitted in electronic form from 2018. Direct payments are not intended for persons who are only owners of land and are not intended for persons who are only owners of land and do not run agricultural activities on them.

In the direct payment system obligatory in Poland, i.a. the so-called degressivity, which consists in reducing the payment by 100% of the surplus of the uniform amount of the area payment over 150,000. euro. Support under direct payments is directed only to the so-called professionally active farmers, and the payment in this respect is not due when the conditions required to obtain them have been artificially created (e.g. by artificially dividing the farm). As part of this support system, standards and cross-compliance requirements are still in force, but since 2015 the cross-compliance principle has reduced the number of requirements and standards in the field of good agricultural culture.

In Poland, under the direct payment system, farm owners can use flat-rate direct payments, which in the new system are called payments for small agricultural holdings. To this payment system, all farmers could voluntarily join in 2015, while farmers receiving no more than EUR 1,250 per farm for direct payments were included in the system automatically, unless they did not agree. Resignation from this type of support is possible, but there is no possibility of re-participation in this system. Under the small farm scheme, the amount of support is determined for each farmer individually as the sum of all payments to which the farmer would be entitled if he remained in the standard system but cannot be more than EUR 1,250 per farm. Every farm can join the system for small agricultural holdings, because there are no restrictions, e.g. in the area of arable land, and farmers participating in this system are exempt from the control of standards and requirements of the cross-compliance principle, as well as from the obligation to apply greening practices.

#### **4      Directions of Distribution of Direct Payments by the          Surveyed Agricultural Holdings**

In Poland in 2004 - 2017, in each campaign, the number of decisions issued on the granting of direct payments was about 1.4 million. In 2017, the amount of payments reached over PLN 14.5 billion, more than twice as in 2004. Over the period 2004 - 2017, the total amount of cash disbursed under direct payments totaled approximately PLN 162.5 billion. These measures contribute to increasing the production capacity of some agricultural holdings, their modernization, and provide financial resources for the farmer and his family. The amounts of payments made in Poland in the years 2004 - 2017 are presented in Table 1.

The research on the directions of the use of funds from direct payments was conducted among small agricultural holdings, active in the field of obtaining EU funds. Therefore, there were agricultural holdings surveyed, which in the years 2004-2015 received direct payments, and at least once received a subsidy as part of investment measures of the CAP programs implemented in these years. Among the surveyed farmers from the Lesser Poland Province, men dominated, representing nearly 80% of respondents, and the largest age group of respondents were people aged at least 40 years - nearly 73%. The largest group among the surveyed agricultural holdings were agricultural holdings with the area of agricultural land in the range of above 4 to 5 ha, whose share in the study sample amounted to nearly 57%, and agricultural holdings in

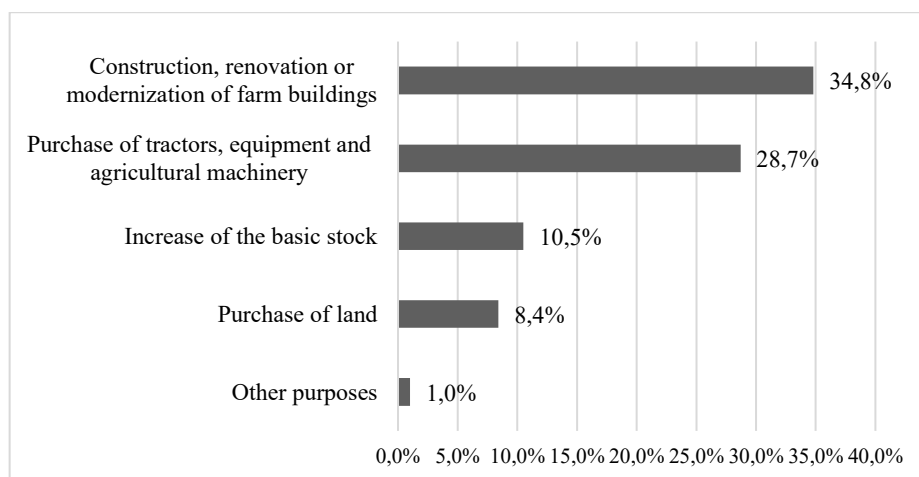
the range above 3 to 4 ha, whose share amounted to almost 27%. Therefore, the research involved mainly relatively large small agricultural holdings. The surveyed farms were characterized by a very high fragmentation of plots being part of the farm, and the majority of surveyed farmers (95%) managed exclusively on their own land. In all surveyed agricultural holdings, except for a single case, plant production was carried out. Among the dominant crops, i.e. those with the greatest economic significance for the farm, respondents named cereals, ground vegetables, and crops under covers. Definitely less surveyed farmers ran animal production because only 27.0% declared that they were farming animals.

**Table 1.** The amount of payments under direct payments in 2004-2017 [PLN].

<b>Year</b>	<b>The amount of payments under direct payments in 2004-2017 [PLN]</b>
2004	6 342 733 900
2005	6 692 219 912
2006	8 202 460 106
2007	8 281 213 405
2008	8 588 832 797
2009	12 150 746 274
2010	12 582 592 251
2011	14 139 698 673
2012	13 734 502 420
2013	14 133 300 833
2014	14 186 691 022
2015	14 314 971 032
2016	14 624 039 591
2017	14 568 703 192
<b>Total</b>	<b>162 542 705 409</b>

In the years 2004-2015, as many as 219 farmers out of the surveyed 296, i.e. 74.0%, expended part of the direct payments received for investments that were carried out on agricultural holdings. The percentage of farmers allocating funds for selected categories of investments is presented in Figure 1.

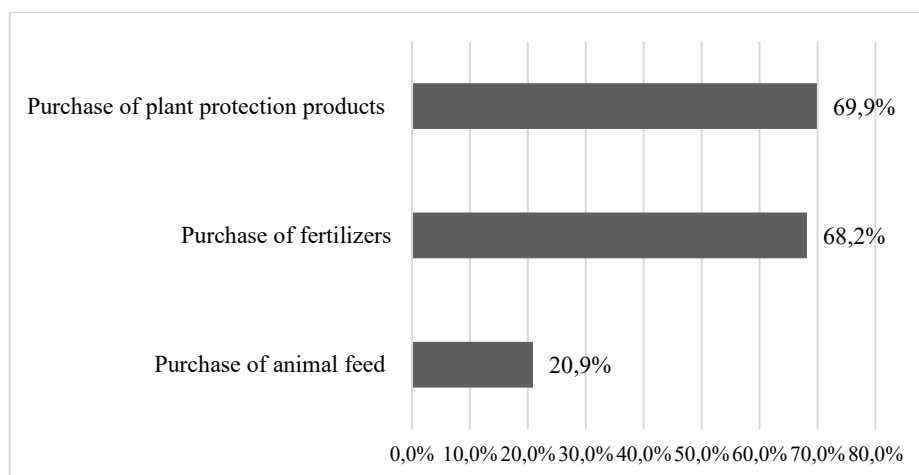




**Fig. 1.** The percentage of farmers allocating funds from direct payments for selected categories of investments in the years 2004-2015.

Most often, funds from direct payments were earmarked for the construction, renovation or modernization of farm buildings (nearly 35% of surveyed farmers), as well as for the purchase of tractors, equipment and agricultural machinery (nearly 29% of surveyed farmers). Another 10.5% of respondents allocated these funds to increase the basic stock, 8.4% for the purchase of land, and 1% for other purposes, e.g. purchase of seedlings. It should be noted that 10% of surveyed farmers allocated direct payments for investment expenditures covering two different categories of investment outlays, of which it can be concluded that they implemented more than one investment or carried out more complex projects covering different categories of investment expenditures. 4.0% of respondents spent direct payments entirely on investments in an agricultural holding.

Funds from direct payments were also allocated by 95.6% of farmers in whole or in part for current expenditures related to agricultural activity conducted in a given agricultural holding (Figure 2). 70.0% of the respondents spent direct payments on both: investments on the farm and expenditures related to the current activity of the agricultural holding, another 14.5% spent direct payments partly on the current activity of their farm and partly on the current consumption of the household, and 11.2% allocated direct payments only to the current expenditures of the farm.



**Fig. 2.** The percentage of farmers allocating funds from direct payments for production expenses related to agricultural activity in 2004-2015.

In the case of financing expenses related to the current activity of the farm, respondents most often indicated that direct payments served as a source of financing for the purchase of plant protection products (69.9%), fertilizers (68.2%), and animal feed (20.9 %).

It should be noted that not all funds obtained from direct payments were spent by the surveyed agricultural holdings for the purposes of agricultural activity. Over 15% of respondents indicated that part of these funds was allocated to the current expenditure of their household, but only in one case the total amount was allocated for this purpose.

The surveyed farmers were also asked to indicate the most effective CAP instruments that favor the development of small agricultural holdings. The most effective instruments include primarily investment aid (subsidies for investments), which was indicated by 76.4% of respondents. It should be emphasized that almost one third of the surveyed farmers (31.8%) considered direct payments for such an instrument.

## 5 Conclusions

Direct payments were one of the first instruments to support Polish agriculture, which was implemented just after Poland's accession to the European Union. Direct payments in the form of so-called simplified payment system for agricultural land (SAPS) were introduced in Poland, which means that payments are granted in proportion to the area of cultivation, and do not depend on the size of agricultural production. Since 2004, these payments have been gradually increasing according to the so-called phasing-in principle, i.e. the rule of gradually reaching the full amount of payments.

In the years 2004-2017, Polish farmers received support in the form of direct payments in the amount of over PLN 162 billion. The surveys carried out in 296 small

agricultural holdings from Lesser Poland Province, which in the years 2004-2015 received direct payments, and at least once received a subsidy in the framework of investment measures of the CAP programs implemented in these years, showed that the funds from direct payments were used primarily to finance the investments carried out on the farm, as well as production expenditure related to agricultural activity. Investments financed from direct payments related mainly to the construction, renovation or modernization of farm buildings, as well as to supplementing and modernization of the machine park. Funds from direct payments were relatively rarely allocated for the purchase of land, which may be result of objective premises, which include difficulties with the purchase of land in the vicinity of the farm or very high and constantly increasing land prices.

Some part of funds from direct payments were also allocated by almost every farmer for current expenditure related to agricultural activity conducted in a holding, mostly on plant protection products, fertilizers and feed. To a relatively small extent, these funds were used for current expenses of farmer's households, what means that they are not mostly intended for consumption purposes. The research results show that among small agricultural holdings there are also those that do not treat direct payments primarily as a source of additional income for the household but use them for the development of the farm. It can be stated that the farmers who receive investment subsidies in the framework of CAP programs are more willing to spend funds from direct payments on development activities and treat direct payments as the source of investment financing complementary to the subsidies. It is highly probable that such an approach will occur in the case of development-oriented small farms located in the whole Poland.

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## Studies with Dimensions of Learning Organization Questionnaire – Research Study

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**Abstract.** In the learning organization concept the learning is realized on organizational level, employees work together, and the goal of the organization is same as the goal of all employees. The learning organization concept has become the subject of many studies over the years. The tool mostly used for measuring the learning organization is the Dimensions of Learning Organization Questionnaire (DLOQ). The DLOQ was translated and used in more than 14 languages during past years. However, in the Czech Republic, only one study with DLOQ in IT sector was conducted in 2018. To determine the further direction of studies in the Czech Republic, the comparison of carried out studies is needed. The research study of 30 studies with DLOQ was conducted. It was found, that the three most popular sectors are: education sector, banking and healthcare. With regard to the current situation in the Czech Republic is recommended to provide next study at high schools (private and public) and to include both students and professors into the study.

**Keywords:** Learning Organization, DLOQ, Dimensions of Learning Organization.

### 1 Introduction

For organizations, knowledge as a source of competitiveness is bottomless. Knowledge in society is considered to be one of the most important way of production, learning as a most important process in terms of sustainable competitive advantage [14]. The learning organization supports both individual and organizational learning, employees share their vision of goals with their colleagues and their personal goals are in line with the organization's goal. Employees are expected to learn, plan actions, solve problems, and assess risks [23, 46].

Learning organizations have several common elements. These are leadership and management, culture, communication systems, information and knowledge, learning levels [6].

The Dimensions of Learning Organization Questionnaire, written by Marsick and Watkins, can be used to measure learning organizations. These authors define 6 action requirements (empowering people for a common vision, supporting query and dialogue, promoting collaboration and team learning, creating opportunities for continuous learning, connecting the organization to the environment, creating systems for

capturing and sharing learning), and basic features to make it possible to evaluate the current state of the organization (the difference between the current and the desired state of the organization). The six action requirements have become the basis for the seven dimensions that characterize the culture of the learning organization. These 7 characteristics are: continuous, collaborative, connected, collective, creative, codified and capacity building. The six action requirements have become the basis for the seven dimensions that characterize the culture of the learning organization [16, 18, 24].

**Table 1.** Seven dimensions of learning organization [16, 24].

Dimension	Definition
D1: Create continuous learning opportunities	Learning is designed so that people can learn by working; opportunities for continuing education and growth are provided.
D2: Promote inquiry and dialogue	People have the ability to think reasonably so that they can express their opinions; people have the ability to listen and examine the opinions of others; organisation culture supports polling, feedback and experimentation
D3: Encourage collaboration and team learning	The work is designed to use a group approach to different ways of thinking; groups are expected to learn and work together; co-operation is appreciated by the organisation culture and is rewarded.
D4: Create systems to capture and share learning	Both old and new shared learning support systems are created and integrated into the organisation and are available to employees.
D5: Empower people toward a collective vision	People are involved in creating, owning and implementing a common vision. The responsibility is moved closer to decision-making so that employees are motivated to learn what they're responsible for.
D6: Connect the organisation to its environment	Helping people to see the impact of their work on the whole business. People watch the environment and use information to adapt workflows. The organisation is linked to its communities.
D7: Provide strategic leadership for learning	Model of leaders, champions and learning support. Leaders use strategic learning to support business results.
<b>KEY RESULTS</b>	
Financial performance	The state of financial stability and resources is available for growth.
Knowledge performance	Improving learning and knowledge products and services (core indicators of intellectual capital).

The DLOQ was translated into more than 14 languages during last years and for its use it is necessary to validate the questionnaire first. The validation rests in use of two independent translators and in calculating the Cronbach's alpha for each dimension optimally [45].

In the Czech Republic, only a few studies have been done so far on the issues of the learning organization. Among the more extensive, we can talk about Adamec's work in 2012, which looked at how aspects of the learning organization are being adopted in the Czech Republic, focused on the learning of managers and executives [3]. Other work that dealt with the Learning Organization was created in 2014. This work focused on applying the concept of a learning organization in a public administration organization [15]. In a particular transport company, two years later, the relationship between corporate culture and the learning organization was explored [38]. In the Czech Republic, we would find many other smaller studies that the learning organization is interested in, but none of the above studies is quantitatively comparable to foreign results. To improve the validity of the results, it is necessary to use a learning organization measurement tool that is used globally and is objectively evaluable. Such a tool is the DLOQ questionnaire by Marsick and Watkins. Until now, only one study has been conducted in the Czech Republic using the DLOQ questionnaire at the turn of 2017/2018 [48]. This study was focused on employees in the IT sector according to CZ Nace: [28]

- J - Information and communication activities
  - 62.0 - Information technology activities
    - 62.01 - Programming
    - 62.02 - Information technology consultancy services
    - 62.03 - Management of computer equipment
    - 62.09 - Other activities in the field of information technology

The question arises as to which other sectors in the Czech Republic should be targeted to make the results as comparable as possible to foreign studies and to provide a coherent picture of the status of learning organizations in the Czech Republic.

The aim of this article is to identify other research sectors based on research, in which it would be appropriate to repeat the DLOQ study by Marsick and Watkins.

## **2 Methodology**

Based on an article review, an overview of studies dealing with the issues of learning organizations using the DLOQ questionnaire was created. The studies were searched through the Web of Science web site and through the Wiley Online Library. The shortcut of the "DLOQ" questionnaire was chosen as the keyword. As basic search criteria, year 2006 and later was chosen by Web of Science. The information obtained from the individual studies was then made more transparent in the table, data processing was carried out using Microsoft Word 2016 and Microsoft Excel 2016.

### 3 Results and Discussion

Since 1993, when the Dimensions of Learning Organization Questionnaire was first published [44], a large number of studies have been conducted that deal with the concept of learning organization. However, not all of the studies use the DLOQ tool to measure the learning organization.

In total, 30 different studies from around the world were included in this study. Respondents in these studies are both employees across the company hierarchy, as well as managers and executives. To obtain optimal information on the status of the learning organization, it would be appropriate to include employees at all levels in the study as it has been shown that there is a difference in the organization's assessment among staff members and executive members [19, 21, 48].

Over the years, studies have been launched using DLOQ especially since 2011. The maximum number of studies focused on learning organizations in general can be seen in 1995 [4].

The most frequent studies were mainly in developing countries in Middle East, six studies were from the European Union. Only one study was conducted worldwide. The large number of studies in developing countries can be justified by efforts to achieve the best results and improve the functioning of local organizations, which could contribute to an overall improvement in the quality of life in these countries.

On average, each study involving about 200 respondents. The largest number of respondents participated in the studies in Taiwan and Thailand. In the case of a learning organization, the number of respondents is often limited by the focus of the study (e. g. addressing only managers and executives).

**Table 2.** Summary of studies.

Country	Year	Sector/Type of Respondent	No of Respondents
Czech Republic [47]	2018	Students of Information Management	20
Czech Republic [48]	2018	IT	201
Korea [37]	2018	Korean workforce-education schools	481
Lebanon [7]	2018	Lebanese firms	298
United Arab Emirates [34]	2018	Logistics, operations, finance, general management	254 firms
Canada [35]	2017	Public library	41
Estonia [42, 43]	2017	Universities	2 Universities
Poland [17]	2017	Cross-cultural	-
Russia [40]	2017	Professional college	340
Saudi Arabia [2]	2017	Education	91
India [19]	2016	Dental institution	236
India [20]	2016	Healthcare -hospitals	315
Iran [10]	2015	Sport organizations	110
Malaysia [27]	2015	Manufacturing companies	321
Nepal [21]	2015	Healthcare - hospital	135



Austria [11]	2014	Banking	143
Greece [9]	2014	Advertising agencies, newspapers, magazines, radio and tele. stations	163
Pakistan [36]	2014	Banking	65
Rwanda [25]	2014	Education	430
Thailand [31]	2014	Industry	576
Sri Lanka [12]	2013	Army	-
Iran [29]	2012	Universities	295
Turkey [39]	2012	Healthcare	243
US [13]	2012	Scenario planning	133
Worldwide Study [41]	2012	Business Schools	105 schools
Iran [33]	2011	Service firms, manufacturing companies	54 firms and companies
North Cyprus [5]	2011	Banking	140
Lebanon [16]	2009	IT, banking	227
Yemen [1]	2008	University libraries	198
Taiwan [22]	2006	Organizations promoting the concept of learning organization	679

The largest number of studies took place in the education sector. If we look at schools and their system more closely, we find that the principles of learning organization are often unintentionally applied (eg teamwork, staff consult with and find solutions). Schools as such have certain prerequisites for being a learning organization [30]. There are total of 64 public, state and private universities in the Czech Republic [26]. This fact provides a basis for the possible focus of a future study in the Czech Republic at universities. If both public and private higher education institutions were included in the study, the question is whether there is a difference between them. Based on a study conducted in the banking sector, the minimum difference between the private and the public sector can be expected [32].

From other sectors, the banking and healthcare sector is most often represented in the studies. In the Czech Republic there is a potentially suitable environment for banking research. An optimal number of respondents could be reached in this sector, as there are currently 46 banks and branches of foreign banks (excluding the Czech National Bank) in the Czech Republic [8]. With regard to the development of IT in recent years and its connection with banking, it is interesting to note that too many studies have not been conducted in this sector. A larger study was conducted in the Czech Republic with 201 respondents in 2018. This study focused on small and medium-sized enterprises in the IT sector. The results were quite surprising. Compared to different foreign studies from other sectors (with respect to the equivalent of studies abroad), the results were the same and higher [48].

The focus of future survey to healthcare is quite interesting in connection with the established system of lifelong education of healthcare workers in the Czech Republic. Given the need to continually replenish knowledge, healthcare facilities could be expected to have great prerequisites for being a learning organization. Surprising is the result of this research study, because the more focus on healthcare and its specific

sectors was expected. The most common respondents in healthcare were not only doctors, but also nurses and other medical staff. In the study from Nepal, significant differences were found between doctors and nurses in two dimensions [21]. Significant differences were observed between professions in other healthcare study too [20].

If we compare the conditions in the Czech Republic with regard to the number of potential respondents in each sector, it seems more appropriate to carry out another study in the education sector.

## 4 Conclusions

Based on the research of already published studies, it can be argued that the education sector is the most attractive field for studying the introduction of the learning organization concept. Due to the number of studies conducted in this sector, the value of the work can be increased by comparing with already completed studies with the same or similar parameters. In the Czech Republic, only one study has been carried out using the DLOQ questionnaire in the IT sector. With regard to the results of the search and the number of potential respondents, the focus of the strategy can be on the universities, healthcare and banking sector.

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